VOLUME 21 / NUMBER 18
SEPTEMBER 23, 1983
ACC. NOS. N83-29171 TO N83-30353

Astronomy The University of Michigan Phoenix Library

Pho
TL
501
.S42

UNIVERSITY OF MICHIGAN
NOV 11 1983
PHOENIX LIBRARY

STAR
AN ABSTRACT JOURNAL

Scientific and Technical Aerospace Reports

25
25th Anniversary
1958-1983

PRODUCED BY THE
SCIENTIFIC AND TECHNICAL
INFORMATION
BRANCH

NASA

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WHAT YOU CAN DO FOR *STAR*

All users of this abstract service are urged to forward reports to be considered for announcement in *STAR*. This will aid NASA in its efforts to provide the fullest possible coverage of all scientific and technical publications that might support aeronautics and space research and development. If you have prepared relevant reports (other than those that you will transmit to NASA, DoD, or DOE through the usual contract- or grant-reporting channels), please send them for consideration to the NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Maryland 21240.

Reprints of journal articles, book chapters, and conference papers are also welcome. These will be considered for announcement in *STAR's* companion journal, *International Aerospace Abstracts*.

You may specify a particular source to be included in a report announcement if you wish; otherwise the report will be placed on public sale at the National Technical Information Service. Copyrighted publications will be announced but not distributed or sold.

PURCHASE OF *STAR*

The semimonthly issues are available postpaid on subscription and in single copy from the Superintendent of Documents, United States Government Printing Office, Washington, D.C. 20402, United States of America.

Semimonthly issues...

Annual subscription rates: $90.00 domestic; $112.00 foreign. Price per single copy: $4.75 domestic; $5.95 foreign.

Annual index issues...

Pricing based upon pagination.

Domestic subscription rates...

Apply to the United States, Canada, Mexico, and all Central and South American countries, except as noted below.

Foreign subscription rates...

Apply to Argentina, Brazil, French Guiana, Guyana, Surinam, Belize, and all other countries throughout the world.

Payment should be by check, money order, or document coupons, and must accompany order. Remittances from foreign countries should be made by international money order or draft on an American bank, payable to the Superintendent of Documents, or by UNESCO book coupons.

PUBLISHED BY:

UNITED STATES GOVERNMENT
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
SCIENTIFIC AND TECHNICAL INFORMATION BRANCH
Scientific and Technical Aerospace Reports, Volume 21, is prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by PRC Government Information Systems.

The Administrator of the National Aeronautics and Space Administration has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Agency. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through February 28, 1985.

US ISSN 0036-8741

INTRODUCTION

The University
of Michigan
Phoenix
Library

Scientific and Technical Aerospace Reports (STAR) is a major component of a comprehensive National Aeronautics and Space Administration information system covering aeronautics, space, and supporting disciplines. *STAR* is issued on the 8th and 23rd of each month and announces current publications of the following types:

- NASA, NASA contractor, and NASA grantee reports
- Reports issued by other U.S. Government agencies, domestic and foreign institutions, universities, and private firms
- Translations in report form
- NASA-owned patents and patent applications
- Dissertations and theses

Cumulative index volumes are published annually.

Journal, book, and conference literature, cover-to-cover journal translations, and certain foreign dissertations are announced in a companion journal, *International Aerospace Abstracts (IAA)*, available on subscription from the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

SUBJECT SCOPE

Subject scope of *STAR*, and *IAA* includes all aspects of aeronautics and space research and development, supporting basic and applied research, and applications. Aerospace aspects of earth resources, energy development, conservation, oceanography, environmental protection, urban transportation, and other topics of high national priority are also covered.

OTHER NASA PUBLICATIONS

Other NASA publications and information services are described in the publication, *The NASA Scientific and Technical Information System ... and How to Use It*, available without charge from the NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Maryland 21240.

HOW TO USE *STAR* SUBJECT CATEGORIES

STAR is categorized by 10 major subject divisions divided into 74 specific subject categories and one general category/division. The major subject divisions are listed in the Table of Contents, together with a note for each that defines its scope and provides any cross-references. For example:

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

Each major division is further divided into as many as nine specific categories, which are identified by category numbers.

Abstracts in *STAR* are grouped by specific category, the categories appearing in sequential order. Category breaks in the abstract section are identified by the category number and title, and a scope note. Cross-references to other categories are provided as appropriate. For example:

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*.

CROSS-REFERENCES

Individual *STAR* abstracts are not ordinarily cross-referenced, except for certain conference reports or book translations that have had separate abstracts written for their component papers or chapters. Citations and abstracts of the components follow immediately after those of the parent document. When the subject content of a component differs sufficiently from the general content of the parent, a cross-reference citation also is printed at the end of the category to which it normally would have been assigned if it were independent.

DOCUMENTS ON MICROFICHE

Documents on microfiche(1) are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

AVAILABILITIES

One or more sources from which a document announced in *STAR* is available to the public is given in each citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size, containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26:1 reduction).

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code following the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page vii.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, as indicated above, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Adminstration, Public Documents Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its' Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this Introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free. (See discussion of patents and patent applications below.)

NASA PATENTS AND PATENT APPLICATIONS

Patents and patent applications owned by NASA are announced in *STAR* under appropriate subject categories and are referenced in the *STAR* indexes. In the Report/Accession Number Index, patents are indexed by the NASA Case Number (which appears in lieu of the report number in other indexes), the U.S. Patent Number, the U.S. Patent Application Serial Number, and the U.S. Patent Class. Patent applications for which patents have not yet been issued are indexed by the NASA Case Number and the U.S. Patent Application Serial Number.

NASA *patent application specifications* are sold in paper copy by the National Technical Information Service at price code A02 ($7.00 domestic; $14.00 foreign). Microfiche are sold at price code A01 ($4.50 domestic; $9.00 foreign). The US-Patent-Appl-SN- number should be used in ordering either paper copy or microfiche from NTIS. Printed copies of *patents* (which are not microfiched) are available for purchase at 50 cents per copy from:

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

When ordering patents, the U.S. Patent Number should be used, and payment must be remitted in advance, preferably by money order or check payable to the Commissioner of Patents and Trademarks. Prepaid purchase coupons for ordering are also available from the Patent and Trademark Office. The patents and patent applications announced in *STAR* are owned by NASA and are available for royalty-free licensing. Requests for licensing terms and further information should be addressed to:

Assistant General Counsel for Patent Matters/Code GP-1
National Aeronautics and Space Administration
Washington, D.C. 20546

ELIGIBILITY AND REGISTRATION FOR NASA INFORMATION PRODUCTS AND SERVICES

A variety of services is available to organizations of the following types that have registered with NASA to receive specific services or products:

1. NASA offices, research centers, contractors, subcontractors, grantees, and consultants;
2. Other U.S. Government agencies and their contractors;
3. Libraries in the United States that have arrangements with NASA to maintain collections of NASA documents for public reference;
4. Other organizations in the United States having a need for NASA documents in work related to aeronautics and space research;
5. Organizations abroad that have established reciprocal document exchange arrangements with NASA.

Only the central service points or central points of document acquisition and control within qualified organizations are eligible to register for NASA products and services. Domestic organizations that may be eligible to receive various classes of NASA publications and services should address their requests for registration or for further information to:

NASA Scientific and Technical Information Facility
ATTN: Registration Activity
P.O. Box 8757
B.W.I. Airport, Maryland 21240

Organizations abroad should direct requests to the same address, but to the attention of: International Exchange Program.

AVAILABILITY OF *STAR* ABSTRACTS ON MICROFICHE

Microfiche of the abstract sections of this issue and other issues of *STAR* are available on annual subscription from NTIS, Attn: Subscriptions, 5285 Port Royal Road, Springfield, Virginia 22161. Annual subscription rates are $60.00 North America; $120.00 foreign. Abstract sections for previous years retroactive to 1964 are available at the current rates. Microfiche for individual *STAR* issue abstract sections are not available.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

Fachinformationszentrum Energie, Physik, Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space Administration
Scientific and Technical Information Branch (NIT-41)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey Library
National Center – MS 950
12201 Sunrise Valley Drive
Reston, Virginia 22092

U.S. Geological Survey Library
2255 North Gemini Drive
Flagstaff, Arizona 86001

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey Library
Box 25046
Denver Federal Center, MS 914
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A

STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1983)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	$ 4.50	$ 9.00
A02	001-025	7.00	14.00
A03	026-050	8.50	17.00
A04	051-075	10.00	20.00
A05	076-100	11.50	23.00
A06	101-125	13.00	26.00
A07	126-150	14.50	29.00
A08	151-175	16.00	32.00
A09	176-200	17.50	35.00
A10	201-225	19.00	38.00
A11	226-250	20.50	41.00
A12	251-275	22.00	44.00
A13	276-300	23.50	47.00
A14	301-325	25.00	50.00
A15	326-350	26.50	53.00
A16	351-375	28.00	56.00
A17	376-400	29.50	59.00
A18	401-425	31.00	62.00
A19	426-450	32.50	65.00
A20	451-475	34.00	68.00
A21	476-500	35.50	71.00
A22	501-525	37.00	74.00
A23	526-550	38.50	77.00
A24	551-575	40.00	80.00
A25	576-600	41.50	83.00
A99	601-up	--1	--2

1/ Add $1.50 for each additional 25 page increment or portion thereof for 601 pages up.

2/ Add $3.00 for each additional 25 page increment or portion thereof for 601 pages and more.

Schedule E

EXCEPTION PRICE SCHEDULE

Paper Copy & Microfiche

Price Code	North American Price	Foreign Price
E01	$ 6.50	$ 13.50
E02	7.50	15.50
E03	9.50	19.50
E04	11.50	23.50
E05	13.50	27.50
E06	15.50	31.50
E07	17.50	35.50
E08	19.50	39.50
E09	21.50	43.50
E10	23.50	47.50
E11	25.50	51.50
E12	28.50	57.50
E13	31.50	63.50
E14	34.50	69.50
E15	37.50	75.50
E16	40.50	81.50
E17	43.50	88.50
E18	46.50	93.50
E19	51.50	102.50
E20	61.50	123.50
E-99 - Write for quote		
N01	35.00	45.00

VOLUME 21 NUMBER 18/SEPTEMBER 23, 1983

TABLE OF CONTENTS

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

01 AERONAUTICS (GENERAL) 2867

02 AERODYNAMICS 2867

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*

03 AIR TRANSPORTATION AND SAFETY 2869

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION 2870

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command and Tracking* and *32 Communications.*

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE 2871

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

06 AIRCRAFT INSTRUMENTATION 2872

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

07 AIRCRAFT PROPULSION AND POWER 2873

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

08 AIRCRAFT STABILITY AND CONTROL 2881

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

09 RESEARCH AND SUPPORT FACILITIES (AIR) 2882

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

ASTRONAUTICS

Includes astronautics (general); astrodynamics; ground support systems and facilities (space); launch vehicles and space vehicles; space transportation; spacecraft communications, command and tracking; spacecraft design, testing and performance; spacecraft instrumentation; and spacecraft propulsion and power.

For related information see also *Aeronautics*

12 ASTRONAUTICS (GENERAL) 2883

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

13 ASTRODYNAMICS 2884

Includes powered and free-flight trajectories; and orbit and launching dynamics.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE) 2884

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

For related information see also *09 Research and Support Facilities (Air).*

15 LAUNCH VEHICLES AND SPACE VEHICLES 2885

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

16 SPACE TRANSPORTATION 2885

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

17 SPACECRAFT COMMUNICATION, COMMAND AND TRACKING 2886

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE 2886

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

19 SPACECRAFT INSTRUMENTATION N.A.

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

20 SPACECRAFT PROPULSION AND POWER 2887

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

CHEMISTRY AND MATERIALS

Includes chemistry and materials (general); composite materials; inorganic and physical chemistry; metallic materials; nonmetallic materials; and propellants and fuels.

23 CHEMISTRY AND MATERIALS (GENERAL) 2888
Includes biochemistry and organic chemistry.

24 COMPOSITE MATERIALS 2888
Includes laminates.

25 INORGANIC AND PHYSICAL CHEMISTRY 2890
Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.
For related information see also *77 Thermodynamics and Statistical Physics.*

26 METALLIC MATERIALS 2895
Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

27 NONMETALLIC MATERIALS 2900
Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

28 PROPELLANTS AND FUELS 2903
Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.
For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

ENGINEERING

Includes engineering (general); communications; electronics and electrical engineering; fluid mechanics and heat transfer; instrumentation and photography; lasers and masers; mechanical engineering; quality assurance and reliability; and structural mechanics.
For related information see also *Physics.*

31 ENGINEERING (GENERAL) 2908
Includes vacuum technology; control engineering; display engineering; and cryogenics.

32 COMMUNICATIONS 2914
Includes land and global communications; communications theory; and optical communications.
For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

33 ELECTRONICS AND ELECTRICAL ENGINEERING 2928
Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuity.
For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics.*

34 FLUID MECHANICS AND HEAT TRANSFER 2934
Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.
For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

35 INSTRUMENTATION AND PHOTOGRAPHY 2938
Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.
For aerial photography see *43 Earth Resources.* For related information see also *06 Aircraft Instrumentation* and *19 Spacecraft Instrumentation.*

36 LASERS AND MASERS 2943
Includes parametric amplifiers.

37 MECHANICAL ENGINEERING 2946
Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

38 QUALITY ASSURANCE AND RELIABILITY 2949
Includes product sampling procedures and techniques; and quality control.

39 STRUCTURAL MECHANICS 2950
Includes structural element design and weight analysis; fatigue; and thermal stress.
For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

GEOSCIENCES

Includes geosciences (general); earth resources; energy production and conversion; environment pollution; geophysics; meteorology and climatology; and oceanography.
For related information see also *Space Sciences.*

42 GEOSCIENCES (GENERAL) 2952

43 EARTH RESOURCES 2952
Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.
For instrumentation see *35 Instrumentation and Photography.*

44 ENERGY PRODUCTION AND CONVERSION 2961
Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.
For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

45 ENVIRONMENT POLLUTION 2971
Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

46 GEOPHYSICS 2974
Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.
For space radiation see *93 Space Radiation.*

47 METEOROLOGY AND CLIMATOLOGY 2979
Includes weather forecasting and modification.

48 OCEANOGRAPHY 2982
Includes biological, dynamic and physical oceanography; and marine resources.

LIFE SCIENCES

Includes sciences (general); aerospace medicine; behavioral sciences; man/system technology and life support; and planetary biology.

51 LIFE SCIENCES (GENERAL) **2985**
Includes genetics.

52 AEROSPACE MEDICINE **2988**
Includes physiological factors; biological effects of radiation; and weightlessness.

53 BEHAVIORAL SCIENCES **2992**
Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT **2993**
Includes human engineering; biotechnology; and space suits and protective clothing.

55 PLANETARY BIOLOGY **2996**
Includes exobiology; and extraterrestrial life.

MATHEMATICAL AND COMPUTER SCIENCES

Includes mathematical and computer sciences (general); computer operations and hardware; computer programming and software; computer systems; cybernetics; numerical analysis; statistics and probability; systems analysis; and theoretical mathematics.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL) **N.A.**

60 COMPUTER OPERATIONS AND HARDWARE **2996**
Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

61 COMPUTER PROGRAMMING AND SOFTWARE **2997**
Includes computer programs, routines, and algorithms.

62 COMPUTER SYSTEMS **3004**
Includes computer networks.

63 CYBERNETICS **3004**
Includes feedback and control theory.
For related information see also *54 Man/System Technology and Life Support.*

64 NUMERICAL ANALYSIS **3005**
Includes iteration, difference equations, and numerical approximation.

65 STATISTICS AND PROBABILITY **3011**
Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

66 SYSTEMS ANALYSIS **3012**
Includes mathematical modeling; network analysis; and operations research.

67 THEORETICAL MATHEMATICS **3013**
Includes topology and number theory.

PHYSICS

Includes physics (general); acoustics; atomic and molecular physics; nuclear and high-energy physics; optics; plasma physics; solid-state physics; and thermodynamics and statistical physics.
For related information see also *Engineering.*

70 PHYSICS (GENERAL) **3013**
For geophysics see *46 Geophysics.* For astrophysics see *90 Astrophysics.* For solar physics see *92 Solar Physics.*

71 ACOUSTICS **3013**
Includes sound generation, transmission, and attenuation.
For noise pollution see *45 Environment Pollution.*

72 ATOMIC AND MOLECULAR PHYSICS **3014**
Includes atomic structure and molecular spectra.

73 NUCLEAR AND HIGH-ENERGY PHYSICS **3020**
Includes elementary and nuclear particles; and reactor theory.
For space radiation see *93 Space Radiation.*

74 OPTICS **3021**
Includes light phenomena.

75 PLASMA PHYSICS **3023**
Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see *46 Geophysics.* For space plasmas see *90 Astrophysics.*

76 SOLID-STATE PHYSICS **3028**
Includes superconductivity.
For related information see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

77 THERMODYNAMICS AND STATISTICAL PHYSICS **3032**
Includes quantum mechanics; and Bose and Fermi statistics.
For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

SOCIAL SCIENCES

Includes social sciences (general); administration and management; documentation and information science; economics and cost analysis; law and political science; and urban technology and transportation.

80 SOCIAL SCIENCES (GENERAL) **3033**
Includes educational matters.

81 ADMINISTRATION AND MANAGEMENT **3033**
Includes management planning and research.

82 DOCUMENTATION AND INFORMATION SCIENCE 3034
Includes information storage and retrieval technology; micrography; and library science.
For computer documentation see *61 Computer Programming and Software.*

83 ECONOMICS AND COST ANALYSIS N.A.
Includes cost effectiveness studies.

84 LAW AND POLITICAL SCIENCE 3037
Includes space law; international law; international cooperation; and patent policy.

85 URBAN TECHNOLOGY AND TRANSPORTATION 3037
Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.
For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.
For related information see also *Geosciences.*

88 SPACE SCIENCES (GENERAL) N.A.

89 ASTRONOMY 3038
Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

90 ASTROPHYSICS 3038
Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION 3039
Includes planetology; and manned and unmanned flights.
For spacecraft design see *18 Spacecraft Design, Testing and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

92 SOLAR PHYSICS 3040
Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION 3040
Includes cosmic radiation; and inner and outer earth's radiation belts.
For biological effects of radiation see *52 Aerospace Medicine.* For theory see *73 Nuclear and High-Energy Physics.*

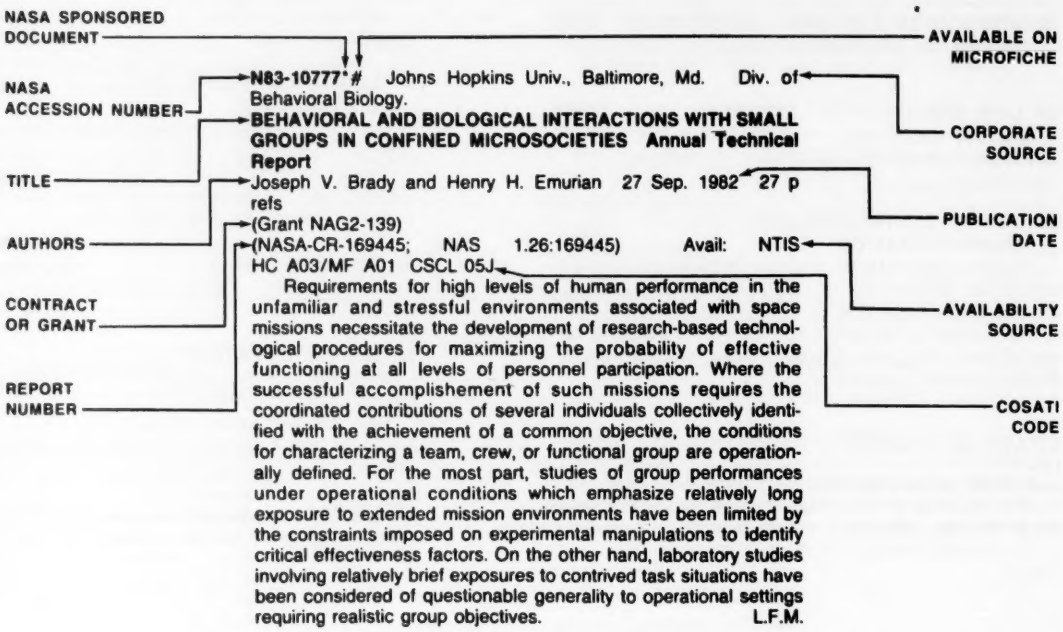
GENERAL

99 GENERAL 3041

Note: N.A. means that no abstracts were assigned to this category for this issue.

SUBJECT INDEX I-1
PERSONAL AUTHOR INDEX I-67
CORPORATE SOURCE INDEX I-77
CONTRACT NUMBER INDEX I-93
REPORT / ACCESSION NUMBER INDEX I-97

TYPICAL CITATION AND ABSTRACT


NASA SPONSORED DOCUMENT
AVAILABLE ON MICROFICHE
NASA ACCESSION NUMBER
N83-10777*# Johns Hopkins Univ., Baltimore, Md. Div. of Behavioral Biology.
CORPORATE SOURCE
TITLE
BEHAVIORAL AND BIOLOGICAL INTERACTIONS WITH SMALL GROUPS IN CONFINED MICROSOCIETIES Annual Technical Report
PUBLICATION DATE
AUTHORS
Joseph V. Brady and Henry H. Emurian 27 Sep. 1982 27 p refs
CONTRACT OR GRANT
(Grant NAG2-139)
REPORT NUMBER
(NASA-CR-169445; NAS 1.26:169445) Avail: NTIS
AVAILABILITY SOURCE
HC A03/MF A01 CSCL 05J
COSATI CODE
Requirements for high levels of human performance in the unfamiliar and stressful environments associated with space missions necessitate the development of research-based technological procedures for maximizing the probability of effective functioning at all levels of personnel participation. Where the successful accomplishement of such missions requires the coordinated contributions of several individuals collectively identified with the achievement of a common objective, the conditions for characterizing a team, crew, or functional group are operationally defined. For the most part, studies of group performances under operational conditions which emphasize relatively long exposure to extended mission environments have been limited by the constraints imposed on experimental manipulations to identify critical effectiveness factors. On the other hand, laboratory studies involving relatively brief exposures to contrived task situations have been considered of questionable generality to operational settings requiring realistic group objectives. L.F.M.

VOLUME 21 NUMBER 18/SEPTEMBER 23, 1983

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N83-29171# Textron Bell Helicopter, Fort Worth, Tex.
ADAPTATION OF PULTRUSION TO THE MANUFACTURE OF HELICOPTER COMPONENTS Final Report, Jan. 1980 - Jan. 1982
Evan E. Blake Army Aviation Research and Development Command Oct. 1982 107 p
(Contract DAAG46-79-C-0089)
(AD-A126291; USAAVRADCOM-TR-82-F-7; AMMRC-TR-82-52) Avail: NTIS HC A06/MF A01 CSCL 13/8

The objective of this program was to produce a helicopter component by pultruding a straight preform, then change the contour of that preform during cure without affecting its cross section. Tooling for pultrusion and postforming was designed. Sixteen lower aft cargo door tracks for the Model UH-1 were manufactured. Author (GRA)

N83-29250# Royal Netherlands Air Force, Volkel.
OPERATIONAL AND MAINTENANCE ASPECTS OF THE INTRODUCTION OF AN ADVANCED FIGHTER TYPE
J. T. Bakker and C. Huurman *In* AGARD Eng. Handling Feb. 1983 12 p (For primary document see N83-29241 18-07)
Avail: NTIS HC A18/MF A01

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N83-29172 Virginia Polytechnic Inst. and State Univ., Blacksburg.
A CONTINUOUS VORTICITY PANEL METHOD FOR THE PREDICTION OF STEADY AERODYNAMIC LOADS ON LIFTING SURFACES Ph.D. Thesis
Albert Tiengtsung Yen 7 Jul. 1983 111 p
Avail: Univ. Microfilms Order No. DA8226913

A continuous vorticity panel method is developed and utilized to predict the steady aerodynamic loads on lifting surfaces having sharp-edge separation. Triangular and semi-infinite panels with linearly varying vorticity are used. The velocity field generated by an individual element is obtained in closed form. A concentrated core of vorticity is employed to simulate the leading-edge-vortex core and its feeding sheet. An optimization scheme is constructed for finding the vorticity at the nodes of the elements. The method is not restricted by aspect ratios, angles of attack, planforms, or camber. The numerical results are in good agreement with the experimental data for both rectangular and delta wings for incompressible flows. Dissert. Abstr.

N83-29173*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EXTENDED MOMENT ARM ANTI-SPIN DEVICE Patent Application
Raymond D. Whipple, inventor (to NASA) Filed 27 Jun. 1983 14 p
(NASA-Case-LAR-12979-1; US-Patent-Appl-SN-508371) Avail: NTIS HC A02/MF A01 CSCL 01A

A device which corrects aerodynamic spin with collapsible boom which extends an aircraft moment arm, and an antispin parachute force that is exerted upon the end of the moment arm to correct intentional or inadvertent aerodynamic spin is described. This configuration effects spin recovery by means of a parachute whose required diameter decreases as an inverse function of the increasing length of the moment arm. The collapsible boom enables the parachute to avoid the aircraft wake without mechanical assistance, retracts to permit steep takeoff, and permits a parachute to correct spin while minimizing associated aerodynamic, structural and in-flight complications. NASA

N83-29174*# United Technologies Research Center, East Hartford, Conn.
AXIAL COMPRESSOR MIDDLE STAGE SECONDARY FLOW STUDY Final Report
Joel H. Wagner, Robert P. Dring, and H. David Joslyn Washington NASA Jul. 1983 98 p refs
(Contract NAS3-23157; DA Proj. 1L1-62209-AH-76)
(NASA-CR-3701; NAS 1.26:3701) Avail: NTIS HC A05/MF A01 CSCL 01A

This report describes an experimental investigation of the secondary flow within and aft of an axial compressor model with thick endwall boundary layers. The objective of the study was to obtain detailed aerodynamic and trace gas concentration traverse data aft of a well documented isolated rotor for the ultimate purpose of improving the design phases of compressor development based on an improved physical understanding of secondary flow. It was determined from the flow visualization, aerodynamic, and trace gas concentration results that the relative unloading of the midspan region of the airfoil inhibitied a fullspan separation at high loading preventing the massive radial displacement of the hub corner stall to the tip. Radial distribution of high and low total pressure fluid influenced the magnitude of the spanwise distribution of loss, such that, there was a general decreases in loss near the hub to the extent that for the least loaded case a negative loss (increase in total pressure) was observed. The ability to determine the spanwise distribution of blockage was demonstrated. Large blockage was present in the endwall regions due to the corner stall and tip leakage with little blockage in the core flow region. Hub blockage was found to increase rapidly with loading. Author

N83-29175*# Cornell Univ., Ithaca, N. Y. School of Mechanics and Aerospace Engineering.
A THEORY OF ROTATING STALL OF MULTISTAGE AXIAL COMPRESSORS Final Report
F. K. Moore Washington NASA Jul. 1983 91 p refs
(Contract IPA-810-626-1)

(NASA-CR-3685; NAS 1.36:3685) Avail: NTIS HC A05/MF A01 CSCL 01A

A theoretical analysis was made of rotating stall in axial compressors of many stages, finding conditions for a permanent, straight-through traveling disturbance, with the steady compressor characteristic assumed known, and with simple lag processes ascribed to the flows in the inlet, blade passages, and exit regions. For weak disturbances, predicted stall propagation speeds agree well with experimental results. For a locally-parabolic compressor characteristic, an exact nonlinear solution is found and discussed. For deep stall, the stall-zone boundary is most abrupt at the trailing edge, as expected. When a complete characteristic having unstalling and reverse-flow features is adopted, limit cycles governed by a Lienard's equation are found. Analysis of these cycles yields predictions of recovery from rotating stall; a relaxation oscillation is found at some limiting flow coefficient, above which no solution exists. Recovery is apparently independent of lag processes in the blade passages, but instead depends on the lags originating in the inlet and exit flows, and also on the shape of the given characteristic diagram. Small external lags and tall diagrams favor early recovery. Implications for future research are discussed. Author

N83-29176*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

WIND-TUNNEL INVESTIGATION OF AERODYNAMIC LOADING ON A 0.237-SCALE MODEL OF A REMOTELY PILOTED RESEARCH VEHICLE WITH A THICK, HIGH-ASPECT-RATIO SUPERCRITICAL WING

Thomas A. Byrdsong and Cuyler W. Brooks, Jr. Jun. 1983 214 p refs

(NASA-TM-84614; L-15536; NAS 1.15:84614) Avail: NTIS HC A10/MF A01 CSCL 01A

Wind-tunnel measurements were made of the wing-surface static-pressure distributions on a 0.237 scale model of a remotely piloted research vehicle equipped with a thick, high-aspect-ratio supercritical wing. Data are presented for two model configurations (with and without a ventral pod) at Mach numbers from 0.70 to 0.92 at angles of attack from -4 deg to 8 deg. Large variations of wing-surface local pressure distributions were developed; however, the characteristic supercritical-wing pressure distribution occurred near the design condition of 0.80 Mach number and 2 deg angle of attack. The significant variations of the local pressure distributions indicated pronounced shock-wave movements that were highly sensitive to angle of attack and Mach number. The effect of the vertical pod varied with test conditions; however at the higher Mach numbers, the effects on wing flow characteristics were significant at semispan stations as far outboard as 0.815. There were large variations of the wing loading in the range of test conditions, both model configurations exhibited a well-defined peak value of normal-force coefficient at the cruise angle of attack (2 deg) and Mach number (0.80). Author

N83-29177*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

FINITE AREA METHOD FOR NONLINEAR SUPERSONIC CONICAL FLOWS Final Report

S. S. Sritharan and A. Richard Seebass Jun. 1983 37 p refs Previously announced in IAA as A82-37475

(Contract NAS1-17070; Grant NGT-03-002-800; Contract N00014-76-C-0182; Grant AF-AFOSR-0107-81)

(NASA-CR-172148; ICASE-83-11; NAS 1.26:172148) Avail: NTIS HC A03/MF A01 CSCL 01A

A fully conservative numerical method for the computation of steady inviscid supersonic flow about general conical bodies at incidence is described. The procedure utilizes the potential approximation and implements a body conforming mesh generator. The conical potential is assumed to have its best linear variation inside each mesh cell; a secondary interlocking cell system is used to establish the flux balance required to conserve mass. In the supersonic regions the scheme is symmetrized by adding artificial viscosity in conservation form. The algorithm is nearly an order of a magnitude faster than present Euler methods and predicts known results accurately and qualitative features such as nodal point lift off correctly. Results are compared with those of other investigators. Author

N83-29178*# Hamilton Standard, Windsor Locks, Conn.

SMALL TRANSPORT AIRCRAFT TECHNOLOGY PROPELLER STUDY Final Report

B. M. Black, B. Magliozzi, and C. Rohrbach 11 Apr. 1983 145 p refs

(Contract NAS3-22039)

(NASA-CR-186045; NAS 1.26:186045; HSER-8826) Avail: NTIS HC A07/MF A01 CSCL 01A

A study to define potential benefits of advanced technology propeller for 1985-1990 STAT commuter airplanes was completed. Two baselines, a Convair, 30 passenger, 0.47 Mach number airplane and a Lockheed, 50 passenger, 0.70 Mach number airplane, were selected from NASA-Ames sponsored airframe contracts. Parametric performance, noise level, weight and cost trends for propellers with varying number of blades, activity factor, camber and diameter incorporating blade sweep, tip proplets, advanced composite materials, advanced airfoils, advanced prevision synchrophasing and counter-rotation are presented. The resulting DOC, fuel burned, empty weight and acquisition cost benefits are presented for resizings of the two baseline airplanes. Six-bladed propeller having advanced composite blades, advanced airfoils, tip proplets and advanced prevision synchrophasers provided the maximum DOC improvements for both airplanes. DOC and fuel burned were reduced by 8.3% and 17.0% respectively for the Convair airplane and by 24.9% and 41.2% respectively for the Lockheed airplane. The larger reductions arose from a baseline definition with very heavy fuselage acoustic treatment. An alternate baseline, with a cabin noise 13dB in excess of the objective, was also studied. B.W.

N83-29179*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

APPLICATIONS OF THE CONTRAVARIANT FORM OF THE NAVIER-STOKES EQUATIONS

Theodore Katsanis 1983 11 p refs Presented at the 6th Computational Fluid Dyn. Conf., Danvers, Mass., 13-15 Jul. 1983; sponsored by AIAA

(NASA-TM-83448; E-1749; NAS 1.15:83448) Avail: NTIS HC A02/MF A01 CSCL 01A

The contravariant Navier-Stokes equations in weak conservation form are well suited to certain fluid flow analysis problems. Three dimensional contravariant momentum equations may be used to obtain Navier-Stokes equations in weak conservation form on a nonplanar two dimensional surface with varying streamsheet thickness. Thus a three dimensional flow can be simulated with two dimensional equations to obtain a quasi-three dimensional solution for viscous flow. When the Navier-Stokes equations on the two dimensional nonplanar surface are transformed to a generalized body fitted mesh coordinate system, the resulting equations are similar to the equations for a body fitted mesh coordinate system on the Euclidean plane. Contravariant momentum components are also useful for analyzing compressible, three dimensional viscous flow through an internal duct by parabolic marching. This type of flow is efficiently analyzed by parabolic marching methods, where the streamwise momentum equation is uncoupled from the two crossflow momentum equations. This can be done, even for ducts with a large amount of turning, if the Navier-Stokes equations are written with contravariant components. Author

N83-29180*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

THE EVALUATION OF THE ROLLING MOMENTS INDUCED BY WRAPAROUND FINS

Arnan Seginer and Benjamin Bar-Haim (Technion - Israel Inst. of Tech.) Jun. 1983 13 p refs

(NASA-TM-84381; A-9399; NAS 1.15:84381) Avail: NTIS HC A02/MF A01 CSCL 01A

A possible reason is suggested for the induced rolling moments

occurring on wraparound-fin configurations in subsonic flight at zero angle of attack. The subsonic potential flow over the configuration at zero incidence is solved numerically. The body is simulated by a distribution of sources along its axis, and the fins are described by a vortex-lattice method. It is shown that rolling moments can be induced on the antisymmetric fins by the radial flow generated at the base of the configuration, either over the converging separated wake, or over the diverging plume of a rocket motor. Author

N83-29181*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
CONVERGENCE CHARACTERISTICS OF NONLINEAR VORTEX-LATTICE METHODS FOR CONFIGURATION AERODYNAMICS
Arnan Seginer, Z. Rusak, and E. Wasserstrom Washington Jun. 1983 21 p refs Presented at the AIAA Computational Fluid Dyn. Conf., Danvers, Mass., 13-15 Jul. 1983 Prepared in cooperation with Technion-Israel Inst. of Tech., Haifa
(NASA-TM-84371; A-9369; NAS 1.15:84371) Avail: NTIS HC A02/MF A01 CSCL 01A

Nonlinear panel methods have no proof for the existence and uniqueness of their solutions. The convergence characteristics of an iterative, nonlinear vortex-lattice method are, therefore, carefully investigated. The effects of several parameters, including (1) the surface-paneling method, (2) an integration method of the trajectories of the wake vortices, (3) vortex-grid refinement, and (4) the initial conditions for the first iteration on the computed aerodynamic coefficients and on the flow-field details are presented. The convergence of the iterative-solution procedure is usually rapid. The solution converges with grid refinement to a constant value, but the final value is not unique and varies with the wing surface-paneling and wake-discretization methods within some range in the vicinity of the experimental result. Author

N83-29182# Neilsen Engineering and Research, Inc., Mountain View, Calif.
A NUMERICAL STUDY OF STRAKE AERODYNAMICS Final Report, Jul. 1980 - Mar. 1982
G. D. Kerlick, G. H. Klopfer, and D. Nixon Jul. 1982 137 p refs (Contract N00014-78-C-0388)
(AD-A125882; NAR-TR-270) Avail: NTIS HC A07/MF A01 CSCL 20/4

As part of a combined experimental and analytical study of vortex shedding at sharp edges characteristic of strakes on fighter aircraft, numerical simulations were made of a two dimensional and a three dimensional case. The former is a sharp-edge flat plate normal to the flow, for which some experimental data were taken earlier in this program. The latter is a double-delta, sharp-edged wing at angle of attack. In both cases, a free-stream Mach number of 0.5 was used. The objective of the work was to investigate the suitability of using the numerical simulation to augment experimental flow field data, after the major features of the simulation were verified by data. Two existing Navier-Stokes codes developed at Ames Research Center NASA were used for the numerical simulations. Neither code had been used in an application involving flow separation, sharp edges, and the aggregation of vorticity into small regions in the flow such as the two present applications demonstrate. The applications of the codes were largely successful, in that for both applications the numerical flow fields generally reproduced the gross flow features exhibited by experimental data. GRA

N83-29183# Technische Hochschule, Darmstadt (West Germany). Inst. fuer Flugtechnik.
THEORETICAL INVESTIGATIONS OF PARTICLE BEHAVIOR IN THE HIGH VELOCITY DOMAIN [THEORETISCHE UNTERSUCHUNGEN ZUM VERHALTEN VON PARTIKELN IM HOCHGESCHWINDGKEITSBEREICH]
Claudio F. Sepulveda 15 Oct. 1982 187 p refs In GERMAN (IFD-2/82) Avail: NTIS HC A09/MF A01

Test particles were studied as an indication of flow velocity for laser stroboscope anemometry of two dimensional flow vector fields in the high flow velocity domain. Equations of motion of the test particles are established for the flow forms: field of constant supersonic flow, oblique compression shock, and expansion fans. The relaxation of different (form, size, density) particles in different (Mach number, Reynolds number) flows with different drag coefficient dependences is assessed. Author (ESA)

N83-29184# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany). Abt. Flugzeug-Project-Aerodynamik.
DESIGN, CONSTRUCTION AND TEST OF AN EXPERIMENTAL PROPELLER IN THE POWER RANGE 750 HP Final Report, Apr. 1982
Herbert Zimmer, Ingo U. Borchers, and Heribert Friedel Bonn Bundesministerium fuer Forschung und Technologie Apr. 1983 54 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-83-004; ISSN-0170-1339) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 11,50

Flight and wind tunnel tests of several propeller types are described. Aerodynamic and acoustic calculations show possibilities for improvement, mainly in the lower and medium speed range. Improved propeller designs were investigated, using profiles with high lift drag ratios and minimal noise emission. A set of experimental propellers was developed, constructed and flight tested. Improvements were achieved in the whole flight regime. The developed blades in three, four or five blade propeller configuration can be used for the propulsion of aircraft from 5 to 14 tons takeoff weight. Author (ESA)

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

N83-29185# Committee on the Judiciary (U. S. House).
AIR DISASTER LITIGATION
Washington GPO 1982 140 p refs Hearings on H.R. 1027 before the Subcomm. on Admin. Law and Govt. Relations of the Comm. on the Judiciary, 97th Congr., 1st and 2d Sess., 10 Dec. 1981 and 24 Feb. 1982
(GPO-97-336) Avail: Subcommittee on Administrative Law and Governmental Relations

Hearings on the bill H.R. 1027 to amend title 28 of the United States Code are presented. A Federal cause of action for, and Federal court procedures with respect to aviation activity, and for some other purposes are established. S.L.

N83-29186*# Analytical Mechanics Associates, Inc., Mountain View, Calif.
MODELING OF THE MODE S TRACKING SYSTEM IN SUPPORT OF AIRCRAFT SAFETY RESEARCH
John A. Sorensen and Tsuyoshi Goka Dec. 1982 91 p refs (NASA Order A-98346-B)
(NASA-CR-166486; NAS 1.26:166486) Avail: NTIS HC A05/MF A01 CSCL 01C

This report collects, documents, and models data relating the expected accuracies of tracking variables to be obtained from the FAA's Mode S Secondary Surveillance Radar system. The data include measured range and azimuth to the tracked aircraft plus the encoded altitude transmitted via the Mode S data link. A brief summary is made of the Mode S system status and its potential applications for aircraft safety improvement including accident analysis. FAA flight test results are presented demonstrating Mode S range and azimuth accuracy and error characteristics and comparing Mode S to the current ATCRBS radar tracking system. Data are also presented that describe the expected accuracy and error characteristics of encoded altitude. These data are used to formulate mathematical error models of the Mode S variables and encoded altitude. A brief analytical assessment is made of the

real-time tracking accuracy available from using Mode S and how it could be improved with down-linked velocity. Author

N83-29187# National Aeronautical Establishment, Ottawa (Ontario). Structures and Materials Lab.
A SURVEY OF SERIOUS AIRCRAFT ACCIDENTS INVOLVING FATIGUE FRACTURE. VOLUME 1: FIXED-WING AIRCRAFT
Glen S. Campbell and R. T. C. Lahey Apr. 1983 266 p 2 Vol.
(NAE-AN-7; NRC-21276) Avail: NTIS HC A12/MF A01

Fixed-wing aircraft accidents are listed by failure type and by aircraft type. Repeated failures are listed. Accidents are listed by year, fatigue-crack initiation sites, and country. Author

N83-29188# National Aeronautical Establishment, Ottawa (Ontario). Structures and Materials Lab.
A SURVEY OF SERIOUS AIRCRAFT ACCIDENTS INVOLVING FATIGUE FRACTURE. VOLUME 2: ROTARY-WING AIRCRAFT
Glen S. Campbell and R. T. C. Lahey Apr. 1983 97 p refs 2 Vol.
(NAE-AN-8; NRC-21277) Avail: NTIS HC A05/MF A01

Rotary wing aircraft accidents, repeated failures, and initiation sites are listed. Accidents are listed by year and country. Author

N83-29189# National Transportation Safety Board, Washington, D. C. Bureau of Accident Investigation.
LARGE AIRPLANE OPERATIONS ON CONTAMINATED RUNWAYS Special Investigation Report, May 1982
22 Apr. 1983 52 p
(PB83-917003; NTSB/SIR-83-02) Avail: NTIS HC A04/MF A01 CSCL 01C

The Safety Board's special investigation examined the issues of maintenance of runway surfaces, the measurement and reporting of runway friction values, the exchange of runway information among ATC, airport personnel and pilots, the airplane certification criteria for operation on contaminated runways, the capability of existing technology to measure runway friction accurately, and the technology available to monitor airplane acceleration. The investigation buttressed the need for: (1) reliable, objective means to measure runway friction during all weather conditions; (2) reliable methods of transmitting that information to pilots; and (3) methods of correlating measured runway friction to airplane performance. As a result of the special investigation, the Safety Board made a number of safety recommendations to the Federal Aviation Administration to resolve the problems associated with airplane performance and contaminated runways. Author

N83-29190# Dayton Univ., Ohio.
INVESTIGATION OF CREW RESTRAINT SYSTEM BIOMECHANICS Report, May 1979 - Mar. 1981
Norman S. Phillips, Robert A. Thomson, and Ira B. Fiscus Wright-Patterson AFB, Ohio Aerospace Medical Research Lab. May 1982 173 p refs
(Contract F33615-79-C-0525; AF Proj. 7231)
(AD-A126199; AFAMRL-TR-81-103) Avail: NTIS HC A08/MF A01 CSCL 05/5

Experimental data were collected and analyses were performed to study the influence of the dynamic mechanical properties of restraint system components on human response to impact and restraint system haulback. Tests were accomplished to isolate the characteristics of the restraint system and the human body. Three restraint webbing materials were studied at varied strain rates. A pyrotechnically powered inertia reel was tested, but could not be analytically modeled successfully. Analytical models of the human and restraint system were used to study the influence of restraint material properties changes on human response parameters. An analytical model of a rhesus monkey was also used to study the efficacy of animal tests and scaling techniques to evaluate restraint systems for human use applications. Author (GRA)

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications.*

N83-29191 Virginia Univ., Charlottesville.
MINIMUM NOISE IMPACT AIRCRAFT TRAJECTORIES Ph.D. Thesis
Robert Graham Melton 1982 210 p
Avail: Univ. Microfilms Order No. DA8228602

A method was developed for studying the feasibility of reducing annoyance due to aircraft noise by modifying the flight trajectories over a community. Numerical optimization is used to compute the optimum flight paths, based upon a parametric form that implicity includes some of the problem restrictions. The other constraints are formulated as penalties in the cost function. Various aircraft on multiple trajectories (landing and takeoff) can be considered. The modular design employed allows for the substitution of alternate models of the population distribution, aircraft noise, flight paths, and annoyance, or for the addition of other features (e.g., fuel consumption) in the cost function. A reduction in the required amount of searching over local minima was achieved through use of the presence of statistical lateral dispersion in the flight paths. Three annoyance models have been studied: noise impact index, level weighted population, and highly annoyed population number. Dissert. Abstr.

N83-29192# Federal Aviation Agency, Atlantic City, N.J. Technical Center.
LORAN-C NONPRECISION APPROACHES IN THE NORTHEAST CORRIDOR Final Report, Sep. 1981 - Jan. 1982
Frank Lorge Jun. 1983 75 p refs
(FAA Proj. 045-330-130)
(FAA-RD-82-78; FAA-CT-82-76) Avail: NTIS HC A04/MF A01

A flight test designed to investigate the suitability of LORAN-C as a nonprecision approach aid in the Northeast Corridor (NEC) is described. Approaches were flown at six selected airports in the NEC by a CH-53A helicopter using LORAN-C for course guidance. Accuracy criteria specified in Advisory Circular (AC) 90-45A were used as the standard for acceptability. Data were recorded for LORAN in area calibrated and uncalibrated modes along with very high frequency omnidirectional radio range (VOR)/distance measuring equipment (DME) raw sensor data for comparison. The results show that the group repetition interval (GRI)-9960 Northeast U.S. LORAN-C chain met AC 90-45A requirements for nonprecision approaches in all cases when a local area calibration was applied. The uncalibrated mode met AC 90-45A requirements at four of the six airports. It was determined that the Seneca, Nantucket, Carolina Beach triad should be used for navigation throughout the flight test area. Author

N83-29193*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
DEVELOPMENT AND EVALUATION OF A KALMAN-FILTER ALGORITHM FOR TERMINAL AREA NAVIGATION USING SENSORS OF MODERATE ACCURACY
Gerd Kanning, Luigi S. Cicolani, and Stanley F. Schmidt (Analytical Mechanics Associates, Inc., Mountain View, Calif.) Jul. 1983 147 p refs
(NASA-TP-2035; A-8955; NAS 1.60:2035) Avail: NTIS HC A07/MF A01 CSCL 17G

Translational state estimation in terminal area operations, using a set of commonly available position, air data, and acceleration sensors, is described. Kalman filtering is applied to obtain maximum estimation accuracy from the sensors but feasibility in real-time computations requires a variety of approximations and devices aimed at minimizing the required computation time with only

negligible loss of accuracy. Accuracy behavior throughout the terminal area, its relation to sensor accuracy, its effect on trajectory tracking errors and control activity in an automatic flight control system, and its adequacy in terms of existing criteria for various terminal area operations are examined. The principal investigative tool is a simulation of the system. Author

N83-29194# Rosenberg (Paul) Associates, Pelham, N. Y.
NAVIGATION: NATIONAL PLANS; NAVSTAR-GPS; LASER GYROS Final Technical Report, 3 Sep. 1980 - 31 Aug. 1982
Paul Rosenberg Warren, Mich. Army Tank-Automotive Command 31 Aug. 1982 158 p refs
(Contract DAAK30-80-C-0073; DA Proj. 1L1-62601-AH-91)
(AD-A125533; TACOM-TR-12686; PRA-8049) Avail: NTIS HC A08/MF A01 CSCL 17/7

Three navigation topics are reviewed, analyzed and summarized: (1) United States national plans for navigation; (2) the NAVSTAR-Global Positioning System; (3) laser gyros including Sagnac interferometer laser gyros and fiberoptic laser gyros. This study is a sequel to USATARADCOM Technical Report No. 12496, Position-Location/Navigation Systems Overview for Military Land Vehicles (AD-A088070). Author (GRA)

N83-29195# Defense Mapping School, Fort Belvoir, Va. Dept. of Topographic Sciences.
THE INFLUENCE OF REFERENCE SYSTEM DISPARITY ON NAVIGATION AND POSITIONING
Gregory A. Robinson and David E. Miller 23 Mar. 1983 15 p refs Presented at the Natl. Aerospace Meeting, Crystal City, Va., 23 Mar. 1983
(AD-A125546) Avail: NTIS HC A02/MF A01 CSCL 08/5

There are many geodetic datums in use throughout the world today. Each of these datums serves as a reference surface for the mapping, charting, and geodetic work done in a specific geographical area. Each datum is defined by fitting a specific ellipsoid to the earth in such a manner as to minimize departures of this reference model from the geoid over the area of concern. Historically, these datums have been relatively oriented. Consequently the position of the center of an ellipsoidal model relative to the center of the mass of the earth is not known. The positions determined on one datum cannot be related accurately to positions on another datum. The development of absolutely-oriented datums incorporating satellite and gravity data has led to the development of datum transformations to relate positions on one datum to those on another. Sophisticated new electronic navigation and targeting technology requires highly precise input data to obtain output on the order of design accuracies. To obtain positions on the order of +/- 1000 feet, care should be taken by the users of such equipment that the datum to which positions are referred is taken into account. GRA

N83-29196# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abt. Anthropotechnik und Simulation.
EVALUATION OF AN AIRBORNE TERMINAL FOR A DIGITAL DATA LINK IN AVIATION
Rainer Uckermann and Hans Radke Nov. 1982 54 p refs In ENGLISH; GERMAN summary
(DFVLR-FB-83-05) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 30,70

Pilot acceptance of an airborne link terminal (ALT), intended as an interface of a data link between aircraft and air control was studied in an Airbus A300 flight simulator. Response time and eye point of regard measurements as well as a questionnaire data were assessed. Results show that the introduction of the ALT has no negative effect on pilots' work pattern and that pilots can benefit from the additional information and control functions offered by the ALT. A significant reduction of ambiguous voice communication between pilot and air traffic controller is achieved. Author (ESA)

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

N83-29197*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PIEZOELECTRIC DEICING DEVICE Patent Application
Robert C. Fink and Bruce A. Banks, inventors (to NASA) Filed 25 Feb. 1983 10 p
(NASA-Case-Lew-13773-1; US-Patent-Appl-SN-469867) Avail: NTIS HC A02/MF A01 CSCL 01C

A fast voltage pulse is applied to a transducer which comprises a composite of multiple layers of alternately polarized piezoelectric material. These layers are bonded together and positioned over the curved leading edge of an aircraft wing structure. Each layer is relatively thin and metallized on both sides. The strain produced in the transducer causes the composite to push forward resulting in detachment and breakup of ice on the leading edge of the aircraft wing. NASA

N83-29198*# McDonnell Aircraft Co., St. Louis, Mo.
SUBSONIC PANEL METHOD FOR DESIGNING WING SURFACES FROM PRESSURE DISTRIBUTION Final Report
D. R. Bristow and J. D. Hawk Washington NASA Jul. 1983 56 p refs
(Contract NAS1-16156)
(NASA-CR-3713; NAS 1.26:3713) Avail: NTIS HC A04/MF A01 CSCL 01C

An iterative method has been developed for designing wing section contours corresponding to a prescribed subcritical distribution of pressure. The calculations are initialized by using a surface panel method to analyze a baseline wing or wing-fuselage configuration. A first-order expansion to the baseline panel method equations is then used to calculate a matrix containing the partial derivative of potential at each control point with respect to each unknown geometry parameter. In every iteration cycle, the matrix is used both to calculate the geometry perturbation and to analyze the perturbed geometry. The distribution of potential on the perturbed gometry is established by simple linear extrapolation from the baseline solution. The extrapolated potential is converted to pressure by Bernoulli's equation. Not only is the accuracy of the approach good for very large perturbations, but the computing cost of each complete iteration cycle is substantially less than one analysis solution by a conventional panel method. B.W.

N83-29199# Army Aviation Engineering Flight Activity, Edwards AFB, Calif.
AIRWORTHINESS AND FLIGHT CHARACTERISTICS TEST (A&FC) OF AH-1S WITH AIRCRAFT GENERAL PURPOSE DISPENSER SYSTEM (AGPDS) Final Report, 12 May - 16 Jun. 1982
James L. Webre and J. David Ottomeyer Aug. 1982 53 p
(AD-A125978; USAAEFA-82-01) Avail: NTIS HC A04/MF A01 CSCL 01/3

The United States Army Aviation Engineering Flight Activity conducted an Airworthiness and Flight Characteristics Tests (A&FC) of a production AH-1S equipped with an M130 Aircraft General Purpose Dispenser System (AGPDS). The A&FC consisted of limited performance and handling qualities tests and was conducted from 12 May through 16 June 1982 at Edwards AFB, California. The tests were conducted to obtain performance and handling qualities data for inclusion in the operator's manual. Installation of the M130 AGPDS on the AH-1S caused negligible effect on power required for level flight. No significant changes in handling qualities were found as a result of the M130 AGPDS. GRA

N83-29200# McDonnell Aircraft Co., St. Louis, Mo. Aerodynamics Dept.
V/STOL FOUNTAIN FORCE COEFFICIENT Final Report

Lloyd W. Glaze, D. R. Bristow, and D. R. Kotansky Jan. 1983 66 p refs
(Contract N62269-81-C-0717; WR02302000)
(AD-A126261; NADC-81106-60) Avail: NTIS HC A04/MF A01 CSCL 01/3

The McDonnell Aircraft Company (MCAIR) V/STOL force and moment methodology was applied to a two-jet, a three-jet and four-jet V/STOL aircraft in hover in ground effect to determine the fraction (Lambda) of the impinging fountain momentum flux transferred to the airframe as a fountain impingement force. The use of potential flow panel methods was verified for the calculation of suckdown forces on V/STOL aircraft in hover, provided the jet entrainment effects are accurately modeled. In addition, an empirical two-jet fountain upwash momentum flux distribution was established for use in predicting the magnitude of the impinging fountain momentum flux. Using the MCAIR methodology, the suckdown force and the total momentum flux incident upon the aircraft were calculated, and the results were compared with experimentally measured induced lift to determine lambda for each aircraft at several heights above ground. The mass entrainment rates associated with an axisymmetric free jet were quantified in an experimental program based upon a new, indirect technique of entrainment measurement. In this new technique, the induced radial velocity field surrounding the free jet was measured using a hot film anemometer. Inverse potential flow theory was then applied to convert the measured radial velocities to free jet mass entrainment rates. GRA

N83-29201# Army Aviation Engineering Flight Activity, Edwards AFB, Calif. Development and Qualification Directorate.
VALIDATION FLIGHT TEST OF UH-60A FOR ROTORCRAFT SYSTEMS INTEGRATION SIMULATOR (RSIS) Final Report, 28 Jul. - 6 May 1982
William Y. Abbott, John O. Bensch, Randall G. Oliver, and Robert A. Williams Sep. 1982 28 p refs
(DA Proj. 1L1-62209-AH-76)
(AD-A125428; USAAEFA-79-24) Avail: NTIS HC A03/MF A01 CSCL 01/3

The United States Army Aviation Engineering Flight Activity (USAAEFA) conducted flight tests of the UH-60A helicopter for the Aeromechanics Laboratory (AL) of the US Army Aviation Research and Technology Laboratories to obtain data for validation of a simulator. A test program of sixty-nine flights totaling 97.4 tests hours was flown to provide AL with extensive handling qualities data. In addition to standard handling qualities tests, special system identification maneuvers were flown. Summary results of those tests are contained in this report. Author (GRA)

N83-29202# General Accounting Office, Washington, D. C. Mission Analysis and Acquisition Div.
ARMY HELICOPTER IMPROVEMENT PROGRAM'S FUTURE MAY DEPEND ON SUCCESS IN CONTROLLING COST Report to the Congress
26 Jan. 1983 19 p
(PB83-168187; GAO/MASAD-83-2; B-209125) Avail: NTIS HC A02/MF A01 CSCL 01C

In less than 3 years, costs of the program to improve the Army's scout helicopter have gone from an initial estimate of $1.3 billion to $2.7 billion. The latest estimate would permit procuring only 578 helicopters instead of the original 720. Additional cost increases can be anticipated. Since the helicopter's configuration was not fully defined when the initial cost estimate was prepared, Defense officials maintain that the initial estimate should not be given too much credence. The Government Accounting Office considers the initial cost estimate, which prompted congressional approval, particularly significant given the repeated congressional objections to the high cost of earlier scout helicopter starts. The Army's ability to contain further cost growth will likely determine the program's future. Author (GRA)

N83-29203# Intermountain Forest and Range Experiment Station, Ogden, Utah.
MEASUREMENTS OF AIRTANKER DROP CONDITIONS DURING FIREFIGHTING OPERATIONS
Charles W. George Dec. 1982 14 p
(PB83-157883; FSRP-INT-299) Avail: NTIS HC A02/MF A01 CSCL 01C

Operational parameters for an S2F airtanker were monitored on a series of wildland fires to verify previous assumptions concerning typical flight envelopes. Results confirmed the validity of the procedure and instrumentation used in obtaining real time aircraft drop height, speed, drop configuration, release sequence, and other related data. In flight, measurements support general assumptions made during previous studies dealing with delivery systems, retardant properties, and in the development of guidelines derived therefrom. Author (GRA)

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

N83-29204*# McDonnell Aircraft Co., St. Louis, Mo.
VARIABLE ACUITY REMOTE VIEWING SYSTEM FLIGHT DEMONSTRATION Final Report
Ralph W. Fisher Jul. 1983 67 p refs
(Contract NAS4-2619)
(NASA-CR-170404; NAS 1.26:170404; MDC-IRO296) Avail: NTIS HC A04/MF A01 CSCL 01D

The Variable Acuity Remote Viewing System (VARVS), originally developed under contract to the Navy (ONR) as a laboratory brassboard, was modified for flight demonstration. The VARVS system was originally conceived as a technique which could circumvent the acuity/field of view/bandwidth tradeoffs that exists in remote viewing to provide a nearly eye limited display in both field of view (160 deg) and resolution (2 min arc) while utilizing conventional TV sensing, transmission, and display equipment. The modifications for flight demonstration consisted of modifying the sensor so it could be installed and flow in a Piper PA20 aircraft, equipped for remote control and modifying the display equipment so it could be integrated with the NASA Research RPB (RPRV) remote control cockpit. Author

N83-29205# Department of the Air Force, Washington, D.C.
USAF (UNITED STATES AIR FORCE) AVIONICS MASTER PLAN
Dec. 1982 283 p
(AD-A125819) Avail: NTIS HC A13/MF A01 CSCL 01/3

This is the fourth annual USAF Avionics Master Plan (AMF). It is prepared by the Deputy for Avionics Control as directed in AFR 800-28, Air Force Policy on Avionics Acquisition and Support. The purpose of the plan is to serve as a guide to the avionics community, to focus resources and energies on common goals, and promulgate strategies to move toward the resolution of common problems. Strong emphasis continues in the avionics program areas of tactical and strategic C3, electronic combat and target acquisition/recognition from the standpoint of improved near/mid term capability. Programs supporting these areas are proceeding essentially as previously planned, with the exception of tactical C3. Significant changes are being planned in the approach to achieving jam resistant communications. The alternative architecture to be selected (scheduled for review and approval in the near future) could impact the JTIDS and Marx XV IFF programs as well as SFFK TALK. GRA

N83-29206# Naval Air Test Center, Patuxent River, Md.
THE 5TH ADVANCED AIRCREW DISPLAY SYMPOSIUM PROCEEDINGS
1981 281 p refs Symp. held at Patuxent, Md., 15-16 Sep. 1981
(AD-A126132) Avail: NTIS HC A13/MF A01 CSCL 05/8

Historical cockpit development is reviewed in response to the expanding flight envelope and the need to improve operational

effectiveness, and the impact of this on the number and type of cockpit displays and controls is shown. The proposed extensions in capability for the next generation aircraft is discussed. The difficulties these extensions cause and possible means such as reclined seats, electro-optical displays, digital data transmission, etc., which can be used to resolve them are also discussed. Cockpit display techniques and their possible impacts on cockpit design are addressed. S.L.

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N83-29207# Library of Congress, Washington, D. C. Science Reference Section.
LC SCIENCE TRACER BULLET: JET ENGINES AND JET AIRCRAFT
George D. Havas, comp. Jun. 1982 9 p
(TB-82-5; ISSN-0090-5232) Avail: NTIS HC A02/MF A01

Sources of information dealing with jet engines and jet aircraft are listed. Technical aspects are emphasized, but historical background is included. This guide is designed, as the name of the series implies, to put the reader on target. S.L.

N83-29208*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
COMBUSTION FUNDAMENTALS RESEARCH
Washington Mar. 1983 252 p refs Proc. of conf. held in Cleveland, 21-22 Oct. 1982
(NASA-CP-2268; E-1525; NAS 1.55:2268) Avail: NTIS HC A12/MF A01 CSCL 21E

Increased emphasis is placed on fundamental and generic research at Lewis Research Center with less systems development efforts. This is especially true in combustion research, where the study of combustion fundamentals has grown significantly in order to better address the perceived long term technical needs of the aerospace industry. The main thrusts for this combustion fundamentals program area are as follows: analytical models of combustion processes, model verification experiments, fundamental combustion experiments, and advanced numeric techniques. For individual titles, see N83-29209 through N83-29233.

N83-29209*# United Technologies Research Center, East Hartford, Conn.
ANALYTICAL MODELING OF OPERATING CHARACTERISTICS OF PREMIXING-PREVAPORIZING FUEL-AIR MIXING PASSAGES
O. L. Anderson *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 1-6 (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 21E

A model for predicting the distribution of liquid fuel droplets and fuel vapor in premixing-prevaporizing fuel-air mixing passages of the direct injection type is described. This model consists of three computer programs: a calculation of the two dimensional or axisymmetric air flow field neglecting the effects of fuel; a calculation of the three dimensional fuel droplet trajectories and evaporation rates in a known, moving air flow; and a calculation of fuel vapor diffusing into a moving three dimensional air flow with source terms dependent on the droplet evaporation rates. The air flow calculation can treat compressible swirling flows in arbitrary ducts with arbitrary distributions of temperature and velocity as initial conditions. The fuel droplets are treated as initial conditions. The fuel droplets are treated as individual particle classes each satisfying Newton's law, a heat transfer, and a mass transfer equation. The vapor diffusion calculation treats three dimensional, gas phase, turbulent diffusion processes with the turbulence level determined by the air flow calculations and the source terms determined by the droplet evaporation rates. Author

N83-29210*# Naval Research Lab., Washington, D. C. Lab. for Computational Physics.
NUMERICAL SIMULATION FOR DROPLET COMBUSTION USING LAGRANGIAN HYDRODYNAMICS
Martin J. Fritts, David E. Fyfe, and Elaine S. Oran *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 7-12 refs (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 21E

A predictive model of spray combustion must incorporate models for the wide variety of physical environments in a practical combustor. In regions where droplets are closely spaced, combustion resembles a diffusion flame; where they are well separated, an envelope or wake flame results. The relative velocity field between the fuel droplets and oxidizer in influences boundary layer development about the droplet, recirculating flow patterns, and droplet shape and stability. A model must encompass these interacting temporal and spatial effects as well as complicated combustor boundaries. The objective of the current work is to develop the triangular gridding method for describing the individual and collective properties of vaporizing and burning fuel droplets. Author

N83-29211*# Pennsylvania State Univ., University Park. Dept. of Mechanical Engineering.
STRUCTURE OF EVAPORATING AND COMBUSTING SPRAYS: MEASUREMENTS AND PREDICTIONS
J.-S. Shuen, A. S. P. Solomon, and G. M. Faeth *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 13-28 refs (For primary document see N83-29208 18-07)
(Grant NAG3-190)
Avail: NTIS HC A12/MF A01 CSCL 21E

Complete measurements of the structure of nonevaporating, evaporating and combusting sprays for sufficiently well defined boundary conditions to allow evaluation of models of these processes were obtained. The development of rational design methods for aircraft combustion chambers and other devices involving spray combustion were investigated. Three methods for treating the discrete phase are being considered: a locally homogeneous flow (LHF) model, a deterministic separated flow (DSF) model, and a stochastic separated flow (SSF) model. The main properties of these models are summarized. Author

N83-29212*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FUEL SPRAY DIAGNOSTICS
Francis M. Humenik and Maria A. Bosque *In its* Combust. Fundamentals Res. Mar. 1983 p 29-38 ref (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 21E

Fundamental experimental data base for turbulent flow mixing models is provided and better prediction of the more complex turbulent chemical reacting flows. Analytical application to combustor design is provided and a better fundamental understanding of the combustion process. Author

N83-29213*# Drexel Univ., Philadelphia, Pa. Dept. of Mechanical Engineering.
POLLUTANT FORMATION IN MONODISPERSE FUEL SPRAY COMBUSTION
N. P. Cernansky and H. Sarv *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 39-47 (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 21E

The combustion of liquid sprays represents an extremely important class of combustion processes. In the transition region, encompassing droplet sizes in the range of 25-80 micron diameter, the mixing and evaporation processes are both incomplete at the flame front and burning occurs in a combined diffusive and

premixed fashion. Under these conditions, the relative importance of heterogeneous and homogeneous effects in dominating the combustion process is switched and gives rise to a number of interesting phenomena. NO (sub x) formation in monodisperse spray combustion was investigated with the following specific objectives: (1) to quantitatively determine the effect of droplet size, number density, etc. on NO sub x formation in monodisperse fuel spray combustion; and (2) to isolate the important physical and chemical phenomena in NO sub x formation in these combustion systems. Author

N83-29214*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FUEL VAPORIZATION EFFECTS **c28**
Maria A. Bosque *In its* Combust. Fundamentals Res. Mar. 1983 p 49-54 (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 21D

A study of the effects of fuel-air preparation characteristics on combustor performance and emissions at temperature and pressure ranges representative of actual gas turbine combustors is discussed. The effect of flameholding devices on the vaporization process and NOx formation is discussed. Flameholder blockage and geometry are some of the elements that affect the recirculation zone characteristics and subsequently alter combustion stability, emissions and performance. A water cooled combustor is used as the test rig. Preheated air and Jet A fuel are mixed at the entrance of the apparatus. A vaporization probe is used to determine percentage of vaporization and a gas sample probe to determine concentration of emissions in the exhaust gases. The experimental design is presented and experimental expected results are discussed. R.J.F.

N83-29215*# California Univ., Irvine. Dept. of Mechanical Engineering.
EFFECT OF LIQUID DROPLETS ON TURBULENCE STRUCTURE IN A ROUND GASEOUS JET **c34**
S. E. Elghobashi and A. M. Mostafa *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 55-64 refs (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 20D

A second-order model which predicts the modulation of turbulence in jets laden with uniform size solid particles or liquid droplets is discussed. The approach followed is to start from the separate momentum and continuity equations of each phase and derive two new conservation equations. The first is for the carrier fluid's kinetic energy of turbulence and the second for the dissipation rate of that energy. Closure of the set of transport equations is achieved by modeling the turbulence correlations up to a third order. The coefficients (or constants) appearing in the modeled equations are then evaluated by comparing the predictions with LDA-measurements obtained recently in a turbulent jet laden with 200 microns solid particles. This set of constants is then used to predict the same jet flow but laden with 50 microns solid particles. The agreement with the measurement in this case is very good. R.J.F.

N83-29216*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
DILUTION ZONE MIXING **c34**
James D. Holdeman *In its* Combust. Fundamentals Res. Mar. 1983 p 65-76 refs (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 20D

Studies to characterize dilution zone mixing; experiments on the effects of free-stream turbulence on a jet in crossflow; and the development of an interactive computer code for the analysis of the mixing of jets with a confined crossflow are reviewed.R.J.F.

N83-29217*# Michigan State Univ., East Lansing. Dept. of Mechanical Engineering.
INFLUENCE OF A LARGE FREE STREAM DISTURBANCE LEVEL ON DYNAMICS OF A JET IN A CROSS FLOW **c34**
John J. Foss and Candace E. Wark *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 77-84 (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 20D

An experiment to study the physical agents that are responsible for the jet turning into the streamwise direction, and the mixing of the jet and the cross stream fluid in the case of a jet in a cross flow is discussed. R.J.F.

N83-29218*# Case Western Reserve Univ., Cleveland, Ohio. Dept. of Mechanical and Aerospace Engineering.
DILUTION JET EXPERIMENTS IN COMPACT COMBUSTOR CONFIGURATIONS
Isaac Greber and James Zizelman *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 85-92 refs (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 21E

The effects of cooling jets on the velocity and temperature fields in a compact reverse flow combustion are discussed. The work is motivated by the need to limit the temperature of past-combustion gases in jet engines to values within the endurance capabilities of turbine blades. The application requires not only that the temperature be kept sufficiently low but also that a suitably tailored temperature profile be provided at the combustor exit, with higher temperatures generally permissible at the blade tip than at the blade root because of higher centrifugal loads at the root. A single jet. As spacing is reduced, jet penetration is also reduced, and the cooling jets tend to remain close to the wall from which they are injected. Results suggest that cooling and temperature distribution tailoring can be accomplished without injecting cooling jets upstream of the turn, and thus it appears that combustors can be made smaller than current designs. R.J.F.

N83-29219*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ANALYTICAL CALCULATION OF A SINGLE JET IN CROSS-FLOW AND COMPARISON WITH EXPERIMENT
R. W. Claus *In its* Combust. Fundamentals Res. Mar. 1983 p 93-100 refs (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 21E

A series of progressively finer grid systems to calculate the single jet in cross-flow experimentally measured were employed. The experimental measurements provide a collection of velocities, turbulence intensities, and jet concentration profiles with measurements of the inlet field. The use of a series of progressively finer grid systems allows a differentiation between numerical errors and the hydrodynamic modeling assumptions embodied in the 3D combustor code. E.A.K.

N83-29220*# Oklahoma State Univ., Stillwater. Dept. of Mechanical and Aerospace Engineering.
TURBULENT COMBUSTOR FLOWFIELD INVESTIGATION
David G. Lilley *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 101-118 refs (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 21E

The 2-D axisymmetric geometries under low speed, nonreacting, turbulent, swirling flow conditions were investigated. The effect of the parameters on isothermal flowfield patterns, time mean velocities and turbulence quantities is determined and an improved simulation in the form of a computer prediction code equipped with a suitable turbulence model is established. This is a prerequisite to the prediction of more complex turbulent reacting flows. E.A.K.

N83-29221*# Detroit Diesel Allison, Indianapolis, Ind.
SMALL GAS TURBINE COMBUSTOR PRIMARY ZONE STUDY
R. E. Sullivan and R. D. Sutton *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 119-130 (For primary document see N83-29208 18-07)
(Contract NAS3-22762)
Avail: NTIS HC A12/MF A01 CSCL 21E

The combustion research program, small gas turbine combustor primary zone study is summarized. The basic elements of a design methodology program to obtain the maximum performance potential

of small reverse-flow annular combustors is described. Three preferred combustion design approaches for internal flame stabilization patterns were selected. Design features are incorporated in the combustors to address the performance limiting problem areas associated with smaller annular combustors. Performance is predicted by using a 3-D aerodynamic/chemical kinetic elliptic flow analysis, initially developed by Garrett Corporation for the USARTL. It is shown that the analytical flow field predictive models provide a useful design tool for understanding the combustion performance of a small reverse flow annular combustor. E.A.K.

N83-29222*# United Technologies Research Center, East Hartford, Conn.
MASS AND MOMENTUM TURBULENT TRANSPORT EXPERIMENTS **c34**
B. V. Johnson *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 131-140 (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 20D

The downstream mixing of coaxial jets discharging in an expanded duct was studied to improve turbulent transport models which are used in computational procedures throughout the propulsion community for combustor flow modeling. Laser velocimeter (LV) and laser induced fluorescence (LIF) techniques were used to measure velocities and concentration and flow visualization techniques to determine the time dependent characteristics of the flow and the scale of the turbulent structure. E.A.K.

N83-29223*# Stanford Univ., Calif. Dept. of Mechanical Engineering.
VELOCITY VISUALIZATION IN GASEOUS FLOWS **c34**
R. K. Hanson, J. C. McDaniel, and B. Hiller *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 141-146 (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 20D

Techniques yielding simultaneous, multiple point measurements of velocity in reacting or nonreacting flow fields have the potential to significantly impact basic and applied studies of fluid mechanics. Several candidate schemes which could provide such measurement capability were investigated. The concepts utilize laser sources which lead to scattered light which can be monitored by a film based camera or a multielement solid state camera. Velocity measurements in supersonic flows using a novel Doppler modulated fluorescence concept are presented. E.A.K.

N83-29224*# Arizona State Univ., Tempe. Dept. of Mechanical and Aerospace Engineering.
MODELING OF FLUCTUATING MASS FLUX IN VARIABLE DENSITY FLOWS **c34**
Ronald M. C. So, H. C. Mongia, and M. Nikjooy *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 147-160 (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 20D

The approach solves for both Reynolds and Favre averaged quantities and calculates the scaler pdf. Turbulent models used to close the governing equations are formulated to account for complex mixing and variable density effects. In addition, turbulent mass diffusivities are not assumed to be in constant proportion to turbulent momentum diffusivities. The governing equations are solved by a combination of finite-difference technique and Monte-Carlo simulation. Some preliminary results on simple variable density shear flows are presented. The differences between these results and those obtained using conventional models are discussed. Author

N83-29225*# Michigan Univ., Ann Arbor. Dept. of Mechanical Engineering and Applied Mechanics.
MONTE CARLO MODELING IN ELLIPTIC FLOWS **c34**
Krishnan Radhakrishnan *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 161-169 refs (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 20D

A Monte Carlo method capable of predicting scalar (e.g., concentration) probability density functions (pdf's) in nonreacting and reacting elliptic flows was developed. A research combustor specifically designed to provide measurements of concentration and temperature pdf's in nonreacting and reacting flows is emphasized. Author

N83-29226*# Garrett Turbine Engine Co., Phoenix, Ariz.
COMPUTATIONS OF EMISSIONS USING A 3-D COMBUSTOR PROGRAM
S. K. Srivatsa *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 171-182 (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 21E

A general 3-D combustor performance program developed by Garrett was extended to predict soot and NOx emissions. The soot formation and oxidation rates were computed by quasi-global models, taking into account the influence of turbulence. Radiation heat transfer was computed by the six-flux radiation mode. The radiation properties include the influence of CO2 and H2O in addition to soot. NOx emissions were computed from a global four-step hydrocarbon oxidation scheme and a set of rate-controlled reactions involving radicals and nitrogen oxides. Author

N83-29227*# Washington Univ., Seattle.
FAST COMPUTATIONAL KINETICS PROGRAM **c25**
David T. Pratt *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 183-198 refs (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 21B

Batch kinetics (1-D) algorithm development, stirred reactor (O-D) algorithm development, and interactive computer programs are summarized. Author

N83-29228*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FLAME RADIATION MEASUREMENTS **c25**
R. W. Claus, F. M. Humenik, and G. M. Neeley *In its* Combust. Fundamentals Res. Mar. 1983 p 199-206 refs (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 21B

Spectral and total flame radiation measurements exhibited: (1) that radiant heat flux increases with vision combustor inlet air pressure; (2) the effect of fuel atomization characteristics on radiant heat flux; and (3) that a reduction in fuel hydrogen content produces a significant increase in radiant heat flux primarily at low combustor pressures. Author

N83-29229*# Northwestern Univ., Evanston, Ill.
LEAN LIMIT PHENOMENA **c25**
C. K. Law *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 207-219 refs (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 21B

The influence of stretch and preferential diffusion on premixed flame extinction and stability was investigated via two model flame configurations, namely the stagnation flame and the bunsen flame. Using a counterflow burner and a stagnation flow burner with a water-cooled wall, the effect of downstream heat loss on the extinction of a stretched premixed flame investigated for lean and rich propane/air and methane/air mixtures. It was demonstrated that extinction by stretch alone is possible only when the deficient reactant is the less mobile one. When it is the more mobile one, downstream heat loss or incomplete reaction is also needed to achieve extinction. The local extinction of bunsen flame tips and edges of hydrocarbon/air premixtures was investigated using a variety of burners. Results show that, while for both rich propane/air and butane/air mixtures tip opening occurs at a constant fuel equivalence ratio of 1.44 and is therefore independent of the intensity, uniformity, and configuration of the approach flow, for rich methane/air flames burning is intensified at the tip and therefore opening is not possible. L.F.M.

N83-29230*# Princeton Univ., N. J.
COUPLING OF TRANSPORT AND CHEMICAL PROCESSES IN CATALYTIC COMBUSTION **c25**
F. V. Bracco, C. Bruno, B. S. H. Royce, D. A. Santavicca, N. Sinha, and Y. Stein *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 221-234 (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 21B

Catalytic combustors have demonstrated the ability to operate efficiently over a much wider range of fuel air ratios than are imposed by the flammability limits of conventional combustors. Extensive commercial use however needs the following: (1) the design of a catalyst with low ignition temperature and high temperature stability, (2) reducing fatigue due to thermal stresses during transient operation, and (3) the development of mathematical models that can be used as design optimization tools to isolate promising operating ranges for the numerous operating parameters. The current program of research involves the development of a two dimensional transient catalytic combustion model and the development of a new catalyst with low temperature light-off and high temperature stablity characteristics. L.F.M.

N83-29231*# Purdue Univ., Lafayette, Ind.
SPONTANEOUS IGNITION CHARACTERISTICS OF HYDROCARBON FUEL-AIR MIXTURES **c25**
Arthur H. Lefebvre and Greg W. Freeman *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 235-238 refs (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 21B

Although the subject of spontaneous ignition of liquid fuels has received considerable attention in the past, the role of fuel evaporation in the overall spontaneous ignition process is still unclear. A main purpose of this research is to carry out measurements of ignition delay times, using fuels of current and anticipated future aeronautical interest, at test conditions that are representative of those encountered in modern gas turbine engines. Attention is focused on the fuel injection process, in particlar the measurement and control of man fuel drop size and fuel-air spatial distribution. The experiments are designed to provide accurate information on the role of fuel evaporation processes in determining the overall ignition delay time. The second objective is to examine in detail the theoretical aspects of spontaneous ignition in order to improve upon current knowledge and understanding of the basic processes involved, so that the results of the investigation can find general and widespead application. L.F.M.

N83-29232*# California Inst. of Tech., Pasadena.
UNSTEADY FLOW EFFECTS IN COMBUSTOR SYSTEMS **c34**
Malladi V. Subbaiah *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 239-248 refs (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 20D

A wide variety of combustion problems, including combustion instabilities and turbulent diffusion flames, appear to involve the entrainment and deformation of laminar flames by large vortex structures in the flow field. First, some details of this process of laminar flame distortion are examined by considering the interactions of time-dependent diffusion flames with two dimensional vortices. Second, Some results on the modelling of the non-steady combustion in burners for aircraft gas turbines are given. The general aim of the work is to develop a one dimensional model applicable to the NASA-Lewis Non-Steady Combustion Rig. L.F.M.

N83-29233*# California Univ., Berkeley.
NUMERICAL MODELING OF TURBULENT COMBUSTION **c25**
A. F. Ghoneim, A. J. Chorin, and A. K. Oppenheim *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 249-263 refs (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 21B

The work in numerical modeling is focused on the use of the random vortex method to treat turbulent flow fields associated with combustion while flame fronts are considered as interfaces between reactants and products, propagating with the flow and at the same time advancing in the direction normal to themselves at a prescribed burning speed. The latter is associated with the generation of specific volume (the flame front acting, in effect, as the locus of volumetric sources) to account for the expansion of the flow field due to the exothermicity of the combustion process. The model was applied to the flow in a channel equipped with a rearward facing step. The results obtained revealed the mechanism of the formation of large scale turbulent structure in the wake of the step, while it showed the flame to stabilize on the outer edges of these eddies. L.F.M.

N83-29234*# Naval Air Propulsion Test Center, Trenton, N.J.
ROTOR FRAGMENT PROTECTION PROGRAM: STATISTICS ON AIRCRAFT GAS TURBINE ENGINE ROTOR FAILURES THAT OCCURRED IN US COMMERCIAL AVIATION DURING 1979 Final Report
R. A. DeLucia and J. T. Salvino Oct. 1982 29 p
(NASA Order C-41581-B)
(NASA-CR-168163; NAS 1.26:168163; NAPC-PE-80) Avail: NTIS HC A03/MF A01 CSCL 21E

Statistical information relating to the number of gas turbine engine rotor failures which occurred during 1979 in commercial aviation service use is provided. The predominant failure mode involved blade fragments, 84 percent of which were contained. No uncontained disk failures occurred and although fewer rotor rim and seal failures occurred, 100 percent and 50 percent, respectively, were uncontained. Sixty-eight percent of the 157 rotor failures occurred during the take-off and climb stages of flight. Author

N83-29235*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
MULTI-FUEL ROTARY ENGINE FOR GENERAL AVIATION AIRCRAFT
Charles Jones (Curtiss-Wright Corp., Woodridge, N.J.), David R. Ellis (Cessna Aircraft Co., Wichita, Kans.), and Phillip R. Meng 1983 47 p refs Presented at the 19th Joint Propulsion Conf., Seattle, 27-29 Jun. 1983; sponsored by AIAA, SAE, and ASME
(NASA-TM-83429; E-1718; NAS 1.15:83429; AIAA-83-1340) Avail: NTIS HC A03/MF A01 CSCL 21E

Design studies of advanced multifuel general aviation and commuter aircraft rotary stratified charge engines are summarized. Conceptual design studies were performed at two levels of technology, on advanced general aviation engines sized to provide 186/250 shaft kW/hp under cruise conditions at 7620 (25000 m/ft) altitude. A follow on study extended the results to larger (2500 hp max.) engine sizes suitable for applications such as commuter transports and helicopters. The study engine designs were derived from relevant engine development background including both prior and recent engine test results using direct injected unthrottled rotary engine technology. Aircraft studies, using these resultant growth engines, define anticipated system effects of the performance and power density improvements for both single engine and twin engine airplanes. The calculated results indicate superior system performance and 27 to 33 percent fuel economy improvement for the rotary engine airplanes as compared to equivalent airframe concept designs with current baseline engines. The research and technology activities required to attain the projected engine performance levels are also discussed. S.L.

N83-29236*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THE NASA BROAD-SPECIFICATION FUELS COMBUSTION TECHNOLOGY PROGRAM: AN ASSESSMENT OF PHASE 1 TEST RESULTS
James S. Fear 1983 13 p refs Presented at the Joint Power Generation Conf., Indianapolis, 25-29 Sep. 1983; sponsored by ASME
(NASA-TM-83447; E-1753; NAS 1.15:83447) Avail: NTIS HC A02/MF A01 CSCL 21E

An assessment is made of the results of Phase 1 screening testing of current and advanced combustion system concepts using several broadened-properties fuels. The severity of each of

several fuels-properties effects on combustor performance or liner life is discussed, as well as design techniques with the potential to offset these adverse effects. The selection of concepts to be pursued in Phase 2 refinement testing is described. This selection takes into account the relative costs and complexities of the concepts, the current outlook on pollutant emissions control, and practical operational problems. Author

N83-29237*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PARAMETRIC STUDY OF FLAME RADIATION CHARACTERISTICS OF A TUBULAR-CAN COMBUSTOR
Francis M. Humenik, Russell W. Claus, and Geralyn M. Neely 1983 13 p refs Proposed for presentation at the Joint Power Generation Conf., Indianapolis, 25-29 Sep. 1983; sponsored by ASME
(NASA-TM-83436; E-1731; NAS 1.15:83436) Avail: NTIS HC A02/MF A01 CSCL 21E

A series of combustor tests were conducted with a tubular-can combustor to study flame radiation characteristics and effects with parametric variations in combustor operating conditions. Two alternate combustor assemblies using a different fuel nozzle were compared. Spectral and total radiation detectors were positioned at three stations along the length of the combustor can. Data were obtained for a range of pressures from 0.34 to 2.07 MPa (50 to 300 psia), inlet temperatures from 533 to 700K (500 to 800 F), for Jet A (13.9 deg hydrogen) and ERBS (12.9% hydrogen) fuels, and with fuel-air ratios nominally from 0.008 to 0.021. Spectral radiation data, total radiant heat flux data, and liner temperature data are presented to illustrate the flame radiation characteristics and effects in the primary, secondary, and tertiary combustion zones. Author

N83-29238# Naval Academy, Annapolis, Md. Hydromechanics Lab.
AN EXPERIMENTAL STUDY OF A HIGH ROTATIONAL SPEED PROPULSOR
August F. Lehman (Lehman (A. F.) Associates, Inc., Centerport, N.Y.) and John Hill Jan. 1983 69 p refs
(AD-A126060; USNA-EW-01-83) Avail: NTIS HC A04/MF A01 CSCL 21/5

A study of an ultra-high rotational speed propulsor, including experimental results, is detailed. The propulsor consists of a helix vane system encapsulated by a thin shell, with a fixed shroud at the exit to convert the radial and rotational velocity components into an axial velocity. The necessity of including the velocity wake deficit of the propulsor (itself) in the design considerations is described. Author (GRA)

N83-29239# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
GAS TURBINES FOR THE PRODUCTION OF ELECTRICAL AND THERMAL ENERGY
V. Potocnik 28 Jan. 1983 30 p refs Transl. into ENGLISH from Energija (Yugoslavia), no. 11-2, 1973 p 375-384
(AD-A126182; FTD-ID(RS)T-1611-82) Avail: NTIS HC A03/MF A01 CSCL 21/5

Basic types of gas turbines are described. A review is presented of the application of gas turbines to the production of electrical and thermal energy. Trends in potential development are discussed. R.J.F.

N83-29240# Deutsche Gold- und Silber-Scheideanstalt, Frankfurt am Main (West Germany). Fertigungstechnik Metall.
GAS TURBINE PARTS MADE OF INJECTION MOLDED SILICON NITRIDE Final Report, Sep. 1981
Ekkehard Lange and Norbert Mueller Bonn Bundesministerium fuer Forschung und Technologie Mar. 1983 39 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-021; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 8

The improvement of the injection molding process for the production of gas turbine parts made of silicon nitride is dealt with. Different turbine parts were fabricated in series of 100 to 1000 parts, and were tested. The quality of smaller parts such as turbine blades and vanes is considerably improved. An average 4-point bending strength of 350 N/sqmm with Weibull values near 20 is achieved. In spin tests rotor blades achieve the specified value of 65 000 1/min without damage. Turbine parts with large volumes, such as rotor hubs can not be fabricated without any failure. Author (ESA)

N83-29241# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
ENGINE HANDLING
Feb. 1983 419 p refs Symp. held at Marathon, Greece, 11-14 Oct. 1982
(AGARD-CP-324; ISBN-92-835-0327-9) Avail: NTIS HC A18/MF A01

Several areas of engine handling were addressed including design analysis, military aircraft engines, thermal transient effects, aerothermodynamic interactions, compressor systems, and control system concepts. For individual titles, see N83-29242 through N83-29269.

N83-29242# Motoren- und Turbinen-Union Muenchen G.m.b.H. (West Germany).
SOME GENERAL TOPICS IN THE FIELD OF ENGINE HANDLING
Klaus Bauerfeind *In* AGARD Eng. Handling Feb. 1983 14 p ref (For primary document see N83-29241 18-07)
Avail: NTIS HC A18/MF A01

A general definition of engine handling can probably be given as achieving a desired state with a minimum of manual effort in the shortest possible time without any undue safety risks. The desired state may comprise such general items as combat readiness or a more specific item like a certain performance level. Engine transient operations as a response to throttle changes represent one of the most critical handling aspects with respect to a potential danger of stalling a compressor under adverse conditions and/or wearing out components. These detrimental effects may have a large influence on the life cycle costs of a weapon system as well as on its effectiveness. Based on good engine/afterburner thermodynamic models for both steady state and transient performance the use of advanced control concepts in conjunction with digital controls will lead towards optimized transients and a more even distribution of safety margins. With the modern digital control boxes there is also a trend and a potential available to include and integrate more and more functions and features directed at fault diagnosis and/or component life accounting. Author

N83-29243# Pratt and Whitney Aircraft, West Palm Beach, Fla. Government Products Div.
DESIGNING FOR FIGHTER ENGINE TRANSIENTS
Bernard L. Koff *In* AGARD Eng. Handling Feb. 1983 15 p (For primary document see N83-29241 18-07)
Avail: NTIS HC A18/MF A01

Operational experience with high performance fighter engines has highlighted the effects of thermal transients on performance, durability, weight and cost as an increasingly important consideration in engine design. Transient thermals within the engine, resulting from rapid throttle movements, cause changes in radial and axial clearances, variable stator vane position, rotor balance, hot part stresses and aerodynamic matching of components. The effect of these transients causing differential thermal expansion and aerodynamic mismatching of components must be accounted for in the design to avoid maintenance action resulting from abnormal engine operation such as stall, high fuel usage and excessive vibration. The component design involving configuration, materials selection, structural analysis and producibility is strongly influenced by the thermal response of rotors, cases, seals, sensors and hot section parts. Author

N83-29244# Aeroplane and Armament Experimental Establishment, Boscombe Down (England). Performance and Trials Management Div.

THE CRITERIA USED FOR ASSESSING ACCEPTABLE ENGINE HANDLING ON UK MILITARY AIRCRAFT

E. J. Bull *In* AGARD Eng. Handling Feb. 1983 11 p refs (For primary document see N83-29241 18-07)

Avail: NTIS HC A18/MF A01

The criteria used to assess the acceptability of engine handling qualities and operating procedures for Service use is reviewed. Criteria discussed include those used to assess engine behavior and response during starting, relighting, throttle movement (in both dry power and reheat range), changes in flight condition, and changes in intake conditions caused by gunfire and weapon delivery. The factors to be considered in establishing these criteria are multifarious and it is not possible to generalize because of the differences posed by different engine installations and operational roles. The qualities that were found necessary during recent trials to meet the required levels of safety and operational effectiveness were discussed. The application of these criteria in the definition of engine operating limits and procedures for Service user were discussed. Author

N83-29245# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).

A LOOK AT ENGINE HANDLING ASPECTS FROM AIRCRAFT FLIGHT TEST EXPERIENCE; WITH AN OUTLOOK FOR FUTURE REQUIREMENTS

H. Fichter and E. Hienz *In* AGARD Eng. Handling Feb. 1983 16 p ref (For primary document see N83-29241 18-07)

Avail: NTIS HC A18/MF A01

The question of airframe/engine compatibility with regard to engine handling under high incidence and various power off-takes assumed special significance as the engine (RB 199 in Tornado) was gradually approaching its production configuration. The effort at localizing and quantifying the somewhat lower than predicted compatibility between airframe and engine involves two separate approaches: full-scale (development aircraft) trials, model tests. During the course of flight testing, various palliatives designed to improve engine handling were successfully implemented. These modifications were developed by means of model trials and later verified in flight tests, ascertaining safe and full handling capability even at the corner points of operational conditions. Further requirements, as viewed for advanced projects, will cover an extended handling envelope. High maneuverability may put some additional strains on aircraft engine integration. Author

N83-29246# Technische Hochschule, Aachen (West Germany). Inst. for Jet Propulsion and Turbomachinery.

OPERATIONAL ENGINE USAGE

W. Koschel *In* AGARD Eng. Handling Feb. 1983 17 p refs (For primary document see N83-29241 18-07)

Avail: NTIS HC A18/MF A01

The flight data recording system LEADS 200 was introduced into a F104G wing of the German Air Force for aircraft and engine maintenance purposes some years ago. The LEADS 200 airborne system components and ground based central flight data processor are described in short below. The main evaluation routines for the engine data used by the maintenance personnel refer to the engine condition monitoring and fault diagnosis. Only for test purposes an engine cycle counting program which registers the variations of selected engine parameters of each flight, was added in order to obtain information on the operational engine usage. The records of these engine cycle counts were evaluated for 1450 flights with 12 different aircrafts and set into relation to the LCF damage of the engine transients. Some results of this analysis and the impacts of the aircraft configuration of the mission type and of the pilot's handling upon the engine usage are discussed. Author

N83-29247# French Air Force, Paris.

HANDLING COMBAT ENGINES: THE PILOTS VIEWPOINT [PILOTABILITE DES MOTEURS DE COMBAT: LE POINT DE VUE DU PILOTE]

Maurice Rougevin-Baville *In* AGARD Eng. Handling Feb. 1983 8 p In FRENCH (For primary document see N83-29241 18-07)

Avail: NTIS HC A18/MF A01

To permit the combat pilot to devote himself to his mission, engine management must be made easier: suppression or simplification or briefings; improvement of the throttle level and control instruments; and operation of supplemental devices such as automatic throttle levers or computers for optimizing fuel consumption. These improvements come about by more powerful integration of the engine in the aircraft. The Mirage 2000 aircraft suggests simple and effective solution to the problem of thrust control. Transl. by A.R.H.

N83-29248# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

FLIGHT TEST EXPERIENCE ON MILITARY AIRCRAFT ENGINE HANDLING

G. Gothan (BWB - LG) and H. Sievers (BWB - LG) *In its* Eng. Handling Feb. 1983 9 p (For primary document see N83-29241 18-07)

Avail: NTIS HC A18/MF A01

With the overall testing of a weapon system the assessment of the engine handling characteristics represents a specific and very important field, since engine handling affects the value of the weapon system considerably. Starting to prepare a test program for the assessment of engine handling characteristics, the following three essential aspects which determined the scope of testing are considered: the fact that it is an official test, the mission of the weapon system, and the specific technical characteristics of the engine. Author

N83-29249# National Defence Headquarters, Ottawa (Ontario). Directorate of Aircraft Engineering and Maintenance.

THROTTLE HANDLING RELATED TO J85 ENGINE PERFORMANCE AND DURABILITY: CANADIAN FORCES EXPERIENCE

R. Hastings and W. L. Macmillan *In* AGARD Eng. Handling Feb. 1983 19 p refs (For primary document see N83-29241 18-07)

Avail: NTIS HC A18/MF A01

Because engine handling can impact two critical areas of engine operation - compressor stall margin and engine durability - the Canadian Forces undertook a flight test program with CF-5 aircraft, employed as an advanced jet trainer and close air support fighter, and Tutor aircraft, employed as primary jet trainers and as a flight demonstration team aircraft. Both aircraft types use versions of the J85 engine. Throttle handling data obtained over a wide variety of missions, from normal training to ground attack, ACM, and demonstration team flying are presented. The methods used to relate mission profile data to mission severity factors are described. The resulting low cycle fatigue life predictions are compared with actual component overhaul rejection data. In connection with CF-5 aircraft compressor stall investigations, the flight test program was successful in identifying throttle techniques involving the use of engine antiice, which improved compressor stall margin under certain conditions. Author

N83-29250# Royal Netherlands Air Force, Volkel.

OPERATIONAL AND MAINTENANCE ASPECTS OF THE INTRODUCTION OF AN ADVANCED FIGHTER TYPE **c01**

J. T. Bakker and C. Huurman *In* AGARD Eng. Handling Feb. 1983 12 p (For primary document see N83-29241 18-07)

Avail: NTIS HC A18/MF A01

In 1979 the first F-16 aircraft entered service with the Royal Netherlands Air Force. Operational and maintenance aspects, which were found significantly different from previous experience, are described. L.F.M.

N83-29251# KHD Luftfahrttechnik G.m.b.H., Oberursel (West Germany).

EXPERIENCE WITH THE KHD APU T312 FOR A MODERN FIGHTER TYPE

K. Piel *In* AGARD Eng. Handling Feb. 1983 15 p refs (For primary document see N83-29241 18-07)
Avail: NTIS HC A18/MF A01

A short description is given of the APU T 312 as a lightweight single spool gas turbine. The installation into the aircraft compartment requires a very short overall length. The solution as to an optimized air inlet is shown. A survey is given on in service experience of the deterioration of compressor efficiency due to air contamination and eventual corrective actions. Cold start capability associated with modern aircraft lubricants is discussed as well as a proposed inflight restart procedure. Author

N83-29252# Rolls-Royce Ltd., Derby (England). Technical Design Group.
MECHANICAL AND THERMAL EFFECTS ON THE TRANSIENT AND STEADY STATE COMPONENT PERFORMANCE OF GAS TURBINES
P. F. Neal *In* AGARD Eng. Handling Feb. 1983 10 p refs (For primary document see N83-29241 18-07)
Avail: NTIS HC A18/MF A01

Gas turbines in a flight installation are subjected to varying mechanical and thermal loading which produces relative deflections between rotating and stationary components. The relative movement usually occurs during transient operation of the engine and results in varying tip clearances, annulus spoiling and increased/decreased seal mass flows. If rubbing and wear occurs during the transient phase, steady state performance of the compressor and turbines may be impaired usually leading to higher fuel consumption, loss of surge margin and higher flame temperatures. The mechanical design of components to minimize transient performance loss can be severely inhibited by cyclic life, weight, mechanical integrity, operational requirements and production testing considerations. It follows that the optimized mechanical design of components to achieve the best overall performance of gas turbines is usually a compromise based on a trade-off between these conflicting requirements. The origin and magnitude of the transient variation in radial and axial deflections during engine operation in flight together with an assessment of the losses produced during transient and steady state engine operation are discussed. Author

N83-29253# Societe Nationale d'Etudes et de Construction de Moteurs d'Aviation, Moissy-Cramayel (France).
THE MATRIX OF AXIAL AND RADIAL PLAYS: THE PRESENT SITUATION AND PERSPECTIVES [MAITRISE DES JEUX AXIAUX ET RADIAUX SITUATION ACTUELLE ET PERSPECTIVES]
Jean Paul Lagrange *In* AGARD Eng. Handling Feb. 1983 19 p refs In FRENCH (For primary document see N83-29241 18-07)
Avail: NTIS HC A18/MF A01

The prediction and calculation of axial and radial play of turbojets has increasing importance because of their direct effect on performance and maneuverability. The different criteria that each type of play should fill, whether for civil or military engines, are presented by specifying the computation methods usually employed. Several typical examples of problems encountered are described as well as the corrective actions to be taken, which should result from compromised performances/mass cost. Perspectives for the short and medium term improvement of prediction models and control techniques are addressed. Transl. by A.R.H.

N83-29254# Motoren- und Turbinen-Union Muenchen G.m.b.H. (West Germany).
TURBINE TIP CLEARANCE CONTROL IN GAS TURBINE ENGINES
D. K. Hennecke and K. Trappmann *In* AGARD Eng. Handling Feb. 1983 12 p refs (For primary document see N83-29241 18-07)
Avail: NTIS HC A18/MF A01

High aerodynamic efficiencies of the turbomachinery of modern aero-engines are only possible if tight tip clearances are achieved by proper thermal matching of rotor and casing. This paper describes various possibilities of passive and active tip clearance control systems that are designed to avoid large rub-ins as well as excessively large gaps during transient operation whilst maintaining very tight clearances during steady-state operation. The impact of these systems on the mechanical design is discussed. Advanced clearance control configurations are described for two actual examples, i.e., the gas generator turbine of a shaft power engine for helicopters and the low-pressure turbine of a large turbofan engine for transport aircraft. The results of the analytical and mechanical designs are presented and the benefits are demonstrated. Author

N83-29255# Glasgow Univ. (Scotland). Dept. of Mechanical Engineering.
MODELS FOR PREDICTING TIP CLEARANCE CHANGES IN GAS TURBINES
P. Pilidis and N. R. L. Maccallum *In* AGARD Eng. Handling Feb. 1983 10 p refs (For primary document see N83-29241 18-07)
Avail: NTIS HC A18/MF A01

Clearances at compressor and turbine blade tips and seals alter during and following transients. These changes affect the performance of the components of the engine. A model was developed to predict these clearance changes. The model divides the stage into casing, blade and disc sections, the disc being split into three elements. A simplified version was produced for inclusion in engine transient performance programs. As an illustration the models were applied to the H.P. Compressor of a two-spool by-pass engine, and to two seals controlling bleed and cooling flows. The results indicate that the effect of compressor blade tip clearance is small. More significant are the effects of the seal clearance changes. Author

N83-29256# National Aerospace Lab., Amsterdam (Netherlands).
DETERIORATION IN SERVICE OF ENGINE TRANSIENT BEHAVIOUR
J. P. K. Vleghert *In* AGARD Eng. Handling Feb. 1983 13 p refs (For primary document see N83-29241 18-07)
Avail: NTIS HC A18/MF A01

A qualitative survey is given of conditions that may lead to stall and the measures that are designed to prevent it, provided the controls are rigged properly. A distinction is made between low corrected speed stall which is often rotating and stable, and rear stage stall which results in surge. Finally two case histories are given which describes some modifications of the standard diagnostic procedures to track down the reason for stall, as well as modified tolerances to improve stall margin. Author

N83-29257# Rolls-Royce Ltd., Bristol (England). Installation Aerodynamics Group.
EFFECTS OF INTAKE FLOW DISTORTION ON ENGINE STABILITY
R. G. Hercock *In* AGARD Eng. Handling Feb. 1983 20 p refs (For primary document see N83-29241 18-07)
Avail: NTIS HC A18/MF A01

Topics covered encompass inlet/engine flow-field interactions and synthesis of time-variant total-pressure distortion using limited high-response pitot instrumentation with turbulent flow modelling. Fundamental aspects of the spool-coupling process are addressed using theoretical methods and extended semi-empirical mathematical models of the developed parallel-compressor type. Problems that need to be resolved in the area of compressor dynamic response are discussed. Future requirements for assessing the distabilizing influence of temperature distortion are outlined. Author

N83-29258# Office National d'Etudes et de Recherches Aeronautiques, Paris (France).
TEST FACILITY FOR BASIC RESEARCH ON DISTORTION
Jacques Huard *In* AGARD Eng. Handling Feb. 1983 17 p refs In FRENCH; ENGLISH summary (For primary document see N83-29241 18-07)
Avail: NTIS HC A18/MF A01

An experimental test facility designed for basic research on the transmission of an inlet distorsion through a single stage axial

flow compressor was realized. The following conditions had to be met: with no distorsion imposed at the inlet, the flow has to be as uniform as possible; the inlet channel must be as long as possible in order to insure a well defined distorsion pattern when a distorsion screen is used; any change in compressor configuration must be easy; and the test instrumentation must give a detailed analysis of the flow in three dimensions. The test facility that was realized with these requirements is described. Results obtained with a stationary and a non-stationary distorsion are presented. Author

N83-29259# Glasgow Univ. (Scotland). Dept. of Mechanical Engineering.
AXIAL COMPRESSOR CHARACTERISTICS DURING TRANSIENTS
N. R. L. Maccallum *In* AGARD Eng. Handling Feb. 1983 13 p refs (For primary document see N83-29241 18-07)
Avail: NTIS HC A18/MF A01

The anticipated effects of heat transfer on the characteristics of an axial-flow air compressor were estimated using two different prediction methods. The second method, which incorporates end-wall boundary layers, predicted somewhat smaller changes of characteristics than those indicated by the earlier method. As the second method uses a model of the flow which is probably more realistic, for the present it is considered that its predictions on heat transfer effects on characteristics are more accurate. In an altitude deceleration of a typical 12-stage compressor it is therefore estimated that surge margins might be reduced by about 20 or 25%. In a sea-level acceleration there are similar increases in surge margins, as compared to adiabatic characteristics. Decreasing the stagger angle increases slightly the susceptibility to characteristics being altered due to heat transfer effects in transients. Author

N83-29260# Detroit Diesel Allison, Indianapolis, Ind.
APPLICATIONS OF A COMPRESSION SYSTEM STABILITY MODEL
Samy Baghdadi *In* AGARD Eng. Handling Feb. 1983 15 p refs (For primary document see N83-29241 18-07)
Avail: NTIS HC A18/MF A01

A mathematical model for compression system aerodynamic stability is presented and discussed. The model is applied to simulate several situations in which the operational stability of aircraft gas turbine engines is compromised, including radial and circumferential inlet pressure and/or temperature distortion, planar inlet pressure pulsations, hot gas ingestion resulting from armament firing, sudden variable geometry resets, and compressor stalling behavior. The theoretical results are validated by comparison with relevant test data. Author

N83-29261# General Electric Co., Evendale, Ohio. Aircraft Engine Business Group.
MODELLING COMPRESSION COMPONENT STABILITY CHARACTERISTICS: EFFECTS OF INLET DISTORTION AND FAN BYPASS DUCT DISTURBANCES
William G. Steenken *In* AGARD Eng. Handling Feb. 1983 15 p refs (For primary document see N83-29241 18-07)
Avail: NTIS HC A18/MF A01

Two extensions to quasi-one dimensional, time dependent aerodynamic stability, digital computer model are presented. These extensions permit studying turbofan compression systems where, in one case, radial variations are important and, in the other, where circumferential variations are important. The basic equations used in the radial flow redistribution model and in the circumferential flow redistribution model are presented. The features of this computer model which lead to inherent numerical stability are discussed. The turbofan system which is being modeled in each case is described, and the manner in which a solution is obtained is presented. The capabilities of the radial flow redistribution model are illustrated by examining the propagation characteristics of a pulse such as might be initiated by augmentor hard lights. Also, the effect of splitter location on pulse propagation is illustrated. The capabilities of the circumferential flow redistribution model are illustrated by coupling it with a parallel compressor model of a fan component to obtain an estimate of the loss in surge pressure ratio due to a 180 deg inlet total pressure distortion. The estimates obtained using both a parallel compressor model and the circumferential flow redistribution parallel compressor model are compared with test data. Author

N83-29262# Carleton Univ., Ottawa (Ontario). Dept. of Mechanical and Aeronautical Engineering.
AN OVERVIEW OF ENGINE DYNAMIC RESPONSE AND MATHEMATICAL MODELING CONCEPTS
H. I. H. Saravanamuttoo (GasTOPS Ltd.) and B. D. MacIsaac (GasTOPS Ltd.) *In* AGARD Eng. Handling Feb. 1983 13 p refs (For primary document see N83-29241 18-07)
Avail: NTIS HC A18/MF A01

The problem of the dynamic response of gas turbines based on fundamental concepts of aerothermodynamic matching of components, leading to a physical understanding of engine behavior and the resulting control requirements is introduced. Although the basic principles are straightforward, implementation requires the use of mathematical models of varying degrees of sophistication. The development of advanced fighter aircraft requires careful integration of engine, control systems and aircraft installation and there must be free exchange of information between the various participants. The various approaches to modelling of engine response, the evolution of computing facilities and the differing requirements of manufacturers and users are discussed. Author

N83-29263# Technische Universitaet, Munich (West Germany).
GENERALIZED DIGITAL SIMULATION TECHNIQUE WITH VARIABLE ENGINE PARAMETER INPUT FOR STEADY STATE AND TRANSIENT BEHAVIOUR OF AERO GAS TURBINES
H. Rick and W. Muggli *In* AGARD Eng. Handling Feb. 1983 20 p refs (For primary document see N83-29241 18-07)
Avail: NTIS HC A18/MF A01

Computerized simulation of aircraft gas turbine engines was used to investigate powerplant and aircraft systems. A generalized digital simulation technique with variable engine parameter input for steady state and transient behavior of typical turbine engines as turbojet, turboprop and especially helicopter engines with and without heat exchanger and variable turbine is presented. Examples are shown of helicopter flights close to the ground at low speeds in complex flow environment as a result of different interaction effects. E.A.K.

N83-29264# National Gas Turbine Establishment, Pyestock (England).
IMPROVEMENTS IN THE DYNAMIC SIMULATION OF GAS TURBINES
R. A. Onions and A. M. Foss *In* AGARD Eng. Handling Feb. 1983 16 p refs (For primary document see N83-29241 18-07)
Avail: NTIS HC A18/MF A01

Thermodynamic simulations which were used to predict both steady state and dynamic engine performance, important for engine and control system designers to make predictions without recourse to expensive engine running. The current status of these models and the extent to which they are capable of reproducing engine performance is reviewed. Simulations based on steady state component characteristics, known inertias and air volumes have not necessarily been capable of predicting the transient response of real engines under all circumstances. While it is possible to alter the assumed inertias of the rotors to tailor the response of the simulation to that of the real engine, this is not physically justified. Alternative approaches aimed at more accurate prediction of the fastest transients are outlined. It is shown that the critical period of an acceleration is during the first fraction of a second. Current models could give misleading results and a stage by stage representation of the compressor should give a more accurate representation. The concepts and techniques of the model together with a comparison of accelerations are presented. E.A.K.

N83-29265# ARO, Inc., Arnold Air Force Station, Tenn.
TECHNIQUES FOR DETERMINING ENGINE STALL RECOVERY CHARACTERISTICS

Grant T. Patterson *In* AGARD Eng. Handling Feb. 1983 14 p refs (For primary document see N83-29241 18-07)
Avail: NTIS HC A18/MF A01

Stall of a compression system component in a gas turbine engine results in engine surge followed by rapid and violent poststall behavior. The poststall behavior is characterized by the response of one component or the interaction between engine components. Experimental investigations of engine stall propagation and recovery require techniques which will characterize component transient and dynamic performance and component interactions during the stall and poststall event. Test, instrumentation, data processing, and analysis techniques were employed in the systematic evaluation of engine stall characteristics. The application of these techniques to the evaluation of stall characteristics of mixed flow augmented turbofan engines is discussed. This includes: (1) an overview of stall inducing test techniques necessary for producing engine stall in a simulated test environment; (2) instrumentation necessary in both response and extent for determining dynamics of the engine flow path and engine control response; and (3) digital and analog data acquisition, data processing digital form, and analysis which primarily utilizes digital techniques and graphics display. E.A.K.

N83-29266# Pratt and Whitney Aircraft, West Palm Beach, Fla. Government Products Div.
DESIGNING FOR STABILITY IN ADVANCED TURBINE ENGINES
Harold D. Stetson *In* AGARD Eng. Handling Feb. 1983 11 p refs (For primary document see N83-29241 18-07)
Avail: NTIS HC A18/MF A01

One of the most critical functional problems which are encountered by a high technology turbine engine is nonrecoverable stall. The only effective means of clearing the nonrecoverable stall is engine shutdown and subsequent airstart, potentially impacting the effectiveness of the weapon system. The design improvements required to make the system more tolerant to the operational environment are addressed. The establishment of design criteria to be applied in the preliminary engine design phase to ensure resistance/avoidance of nonrecoverable stalls while ensuring adequate engine operability in the form of airstart capability and engine throttle response are discussed. The mechanisms of rotating stall, the design improvements to resist/avoid rotating stall, their projected effectiveness in reducing operational problems, and engine test results of some of these design improvements are identified. E.A.K.

N83-29267# Office National d'Etudes et de Recherches Aerospatiales, Toulouse (France). Centre d'Etudes et de Recherches.
THE MODERN CONCEPT OF ACCELERATION CONTROL: INTRODUCTION TO OPTIMAL COMMAND IN A HANDLING BY OBJECTIVE STRUCTURE [CONCEPT MODERN DE CONTROLE DE L'ACCELERATION: INTRODUCTION DE COMMANDE OPTIMALE DANS UNE STRUCTURE DE PILOTAGE PAR OBJECTIF]
Claude Barrouil and Jacques Delmas *In* AGARD Eng. Handling Feb. 1983 9 p In FRENCH (For primary document see N83-29241 18-07)
Avail: NTIS HC A18/MF A01

Theoretical studies carried out on an aircraft engine usually employ a linear representation of the system studied. This approach is perfectly justified for computing the regulation gain at a stabilized operating point. To study the change of regime, a nonlinear representation is more precise but the mathematical tools of investigation are more delicate to use. Results are presented of a study undertaken at by DRET and conducted in collaboration with SNECMA during which the results of a nonlinear study of transition were integrated with a linear study of regulation in the same regulator. Transl. by A.R.H.

N83-29268# National Gas Turbine Establishment, Pyestock (England).
A NEW APPROACH TO REHEAT CONTROL
M. J. Porter *In* AGARD Eng. Handling Feb. 1983 11 p refs (For primary document see N83-29241 18-07)
Avail: NTIS HC A18/MF A01

The task of the reheat (afterburner) control system is to provide as rapid a thrust response as possible without exceeding reheat stability limits or engine limits. As there is at least one reheat fuel flow to control and also a variable nozzle area to control, a variety of control strategies are considered. A closed loop controller, incorporating automatic buzz-avoidance is described and the results of an engine test bed evaluation are presented. E.A.K.

N83-29269# Grumman Aerospace Corp., Bethpage, N.Y.
POTENTIAL BENEFITS OF A FULL AUTHORITY DIGITAL ELECTRONIC CONTROL (FADEC) INSTALLED ON A TF30 ENGINE IN AN F14 FLIGHT TEST DEMONSTRATOR AIRCRAFT
C. A. Hoelzer, W. H. Nufer, R. H. Tindell, and R. W. Vizzini (NAPC) *In* AGARD Eng. Handling Feb. 1983 17 p refs (For primary document see N83-29241 18-07)
Avail: NTIS HC A18/MF A01

A systems analysis, preliminary installation design, and flight test definition for an integrated F-14/TF30/FADEC demonstrator aircraft flight test configuration was completed. The modifications, tests, and installation support to incorporate FADEC's on the TF30, were defined. An overall plan for the F14 design and modifications, procurement, fabrication, ground test and flight test program was developed. The program includes a 22 flight development demonstration of F-14/TF30/FADEC fuel controls technology and inlet control on an F14 aircraft. The major tasks include design and development of the FADEC on the TF30, and the planning and performance of systems, sea level and altitude chamber tests. Many potential areas of F14 and TF30 generic or general aircraft and propulsion system benefits which could be accrued through the use of integrated aircraft/engine FADEC technology are identified. These include improved air inlet engine compatibility, improved propulsion system reliability and maintainability, increased loiter time, mission fuel savings, reduction in weight, and incorporation of some F14 propulsion system independent features into FADEC. E.A.K.

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N83-29270*# Information and Control Systems, Inc., Hampton, Va.
DESIGN, IMPLEMENTATION AND FLIGHT TESTING OF PIF AUTOPILOTS FOR GENERAL AVIATION AIRCRAFT
John R. Broussard Washington NASA Jul. 1983 177 p refs (Contract NAS1-16303)
(NASA-CR-3709; NAS 1.26:3709; TR-681102) Avail: NTIS HC A09/MF A01 CSCL 01C

The designs of Proportional-Integrated-Filter (PIF) auto-pilots for a General Aviation (NAVION) aircraft are presented. The PIF autopilot uses the sampled-data regulator and command generator tracking to determine roll select, pitch select, heading select, altitude select and localizer/glideslope capture and hold autopilot modes. The PIF control law uses typical General Aviation sensors for state feedback, command error integration for command tracking, digital complementary filtering and analog prefiltering for sensor noise suppression, a control filter for computation delay accommodation and the incremental form to eliminate trim values in implementation. Theoretical developments described in detail, were needed to combine the sampled-data regulator with command generator tracking for use as a digital flight control system. The digital PIF autopilots are evaluated using closed-loop eigenvalues and linear simulations. The implementation of the PIF autopilots in a digital flight computer using a high order language (FORTRAN) is briefly described. The successful flight test results for each PIF autopilot mode is presented. Author

N83-29271*# Virginia Polytechnic Inst. and State Univ., Blacksburg.
STUDY OF AN AUTOMATIC TRAJECTORY FOLLOWING CONTROL SYSTEM Final Report
H. F. VanLandingham, Richard L. Moose, Philip E. Zwicke, William H. Lucas, and Joel D. Brinkley Hampton, Va. NASA. Langley Research Center Jul. 1983 86 p refs
(Contract NsG-1354)
(NASA-CR-166121; NAS 1.26:166121) Avail: NTIS HC A05/MF A01 CSCL 01C

It is shown that the estimator part of the Modified Partitioned Adaptive Controller, (MPAC) developed for nonlinear aircraft dynamics of a small jet transport can adapt to sensor failures. In addition, an investigation is made into the potential usefulness of the configuration detection technique used in the MPAC and the failure detection filter is developed that determines how a noise plant output is associated with a line or plane characteristic of a failure. It is shown by computer simulation that the estimator part and the configuration detection part of the MPAC can readily adapt to actuator and sensor failures and that the failure detection filter technique cannot detect actuator or sensor failures accurately for this type of system because of the plant modeling errors. In addition, it is shown that the decision technique, developed for the failure detection filter, can accurately determine that the plant output is related to the characteristic line or plane in the presence of sensor noise. Author

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N83-29272*# United Technologies Corp., Stratford, Conn.
DEVELOPMENT OF MONOFILAR ROTOR HUB VIBRATION ABSORBER
J. Duh and W. Miao May 1983 91 p refs
(Contract NAS1-16700)
(NASA-CR-166088; NAS 1.26:166088) Avail: NTIS HC A05/MF A01 CSCL 14B

A design and ground test program was conducted to study the performance of the monofilar absorber for vibration reduction on a four-bladed helicopter. A monofilar is a centrifugal tuned two degree-of-freedom rotor hub absorber that provides force attenuation at two frequencies using the same dynamic mass. Linear and non-linear analyses of the coupled monofilar/airframe system were developed to study tuning and attenuation characteristics. Based on the analysis, a design was fabricated and impact bench tests verified the calculated non-rotating natural frequencies and mode shapes. Performance characteristics were measured using a rotating absorber test facility. These tests showed significant attenuation of fixed-system 4P hub motions due to 3P inplane rotating-system hub forces. In addition, detuning effects of the 3P monofilar modal response were small due to the nonlinearities and tuning pin slippage. However, attenuation of 4P hub motions due to 5P inplane hub forces was poor. The performance of the 5P monofilar modal response was degraded by torsional motion of the dynamic mass relative to the support arm which resulted in binding of the dynamic components. Analytical design studies were performed to evaluate this torsional motion problem. An alternative design is proposed which may alleviate the torsional motion of the dynamic mass. Author

N83-29273*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
MAGNETIC SUSPENSION AND BALANCE SYSTEMS, A SELECTED, ANNOTATED BIBLIOGRAPHY
Marie H. Tuttle, Robert A. Kilgore, and Richmond P. Boyden Jul. 1983 50 p Revised
(NASA-TM-84661; L-15626; NAS 1.15:84661) Avail: NTIS HC A03/MF A01 CSCL 14B

This publication, containing 206 entries, supersedes an earlier bibliography, NASA TM-80225 (April 1980). Citations for 18 documents have been added in this updated version. Most of the additions report results of recent studies aimed at increasing the research capabilities of magnetic suspension and balance systems, e.g., increasing force and torque capability, increasing angle of attack capability, and increasing overall system reliability. Some of the additions address the problem of scaling from the relatively small size of existing systems to much larger sizes. The purpose of this bibliography is to provide an up-to-date list of publications that might be helpful to persons interested in magnetic suspension and balance systems for use in wind tunnels. The arrangement is generally chronological by date of publication. However, papers presented at conferences or meetings are placed under dates of presentation. The numbers assigned to many of the citations have been changed from those used in the previous bibliography. This has been done in order to allow outdated citations to be removed and some recently discovered older works to be included in their proper chronological order. Author

N83-29274# Army Armament Research and Development Command, Aberdeen Proving Ground, Md. Chemical Systems Lab.
EXPERIMENTAL AERODYNAMIC FACILITIES OF THE AERODYNAMICS RESEARCH AND CONCEPTS ASSISTANCE SECTION
Miles C. Miller Feb. 1983 26 p
(DA Proj. 1L1-61102-A-71A)
(AD-A126272; ARCSL-SP-83007) Avail: NTIS HC A03/MF A01 CSCL 14/2

The primary mission involves research and development support related to the aerodynamic and aeroballistic aspects of advanced chemical delivery vehicles. This includes the evaluation and optimization of advanced aerodynamic chemical munition configurations as well as the analysis of the effects of chemical type payloads on their flight performance. Secondly, because of the technical expertise of the ARCAS personnel and their special aerodynamic laboratory facilities, the mission also includes providing assistance to ARRADCOM and DOD in demonstrating the feasibility of advanced aerodynamic weapons concepts. To support this mission, the ARCAS possesses an aerodynamic laboratory with a unique array of experimental aerodynamic facilities including four wind tunnels and a special projectile flight simulator. The wind tunnels cover the subsonic, transonic, and supersonic speed regimes and also include a special vertical wind tunnel facility. The flight simulator allows full sized artillery payloads to undergo the simultaneous spinning and coning motion of the projectile in flight. GRA

N83-29275# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Structural Vibration Branch.
VIBRATION AND AEROELASTIC FACILITY Final Report, Jan. 1977 - Dec. 1981
Phyllis G. Bolds Dec. 1982 100 p refs
(AF Proj. 2401)
(AD-A126317; AFWAL-TR-82-3054) Avail: NTIS HC A05/MF A01 CSCL 14/2

The Vibration and Aeroelastic Facility of the Air Force Wright Aeronautical Laboratories is used for recording and analyzing dynamics data. New instrumentation systems have made possible a significant increase in the quantity of measurements which can be acquired to define the dynamics environment in various aircraft, missile, and ground support equipment. To reduce the large quantities of data to a usable form, processing techniques based upon the use of spectrum analyzers and minicomputers are employed. These techniques are described and methods are illustrated for presenting statistical quantities defining the spectral composition of dynamics environments. GRA

N83-29276# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
SURVEY OF MISSILE SIMULATION AND FLIGHT MECHANICS

FACILITIES IN NATO
Willard M. Holmes (Army Missile Command, Redstone Arsenal, Ala.) [1982] 103 p
(AGARD-AG-279; ISBN-92-835-1448-3) Copyright. Avail: NTIS HC A06/MF A01

A survey of missile system simulation facilities was conducted. Information from this task addresses missile system and subsystem simulation capabilities, methodology of simulation development, simulation model verification and validation. In addition, approaches and procedures were recommended that would enhance cooperative development of missile system simulation, test and evaluation as related to missile system flight mechanics. S.L.

N83-29277# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
PROCEEDINGS OF THE AGARD FLUID DYNAMICS SPECIALISTS MEETING ON WALL INTERFERENCE IN WIND TUNNELS
Travis W. Binion, Jr. (Calspan Field Services, Inc., Arnold AFS, Tenn.) [1982] 12 p refs Proc. held in London, 19-20 May 1982 Submitted for publication
(AGARD-AR-190; AGARD-CP-335; ISBN-92-835-1447-5) Avail: NTIS HC A02/MF A01

The effects of wind tunnel wall interference are studied. Endeavors were undertaken to learn how to correct wind tunnel data or to reduce the wall induced interference. Successful efforts are largely limited to solid wall, low speed situations. The invention of ventilated wall tunnels did much to reduce the tunnel boundary induced interferences, and the adaptive wall concept promises to finally provide a test environment with neglibible wall interference. GRA

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

N83-29278*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PRESSURE DISTRIBUTIONS OBTAINED ON A 0.04-SCALE AND 0.02-SCALE MODEL OF THE SPACE SHUTTLE ORBITER'S FORWARD FUSELAGE IN THE LANGLEY CONTINUOUS FLOW HYPERSONIC TUNNEL
Pamela F. Bradley, Paul M. Siemers, III, Paul F. Flanagan, and Martin W. Henry Mar. 1983 63 p refs
(NASA-TM-84630; NAS 1.15:84630) Avail: NTIS HC A04/MF A10 CSCL 22B

Results from pressure distribution tests on 0.04-scale and 0.02-scale models of the forward fuselage of the Space Shuttle Orbiter are presented without analysis. The tests wre completed in the Langley Continuous Flow Hypersonic Tunnel (CFHT). The 0.04-scale model was tested at angles of attack from -5 deg to 45 deg and angles of sideslip from -3 deg to 3 deg. The 0.02-scale model was tested at angles of attack from -10 deg to 45 deg and angles of sideslip from -5 deg to 5 deg. The tests were conducted in support of the development of the Shuttle Entry Air Data System (SEADS). In addition to modeling the 20 SEADS pressure orifices, the wind-tunnel models were also instrumented with orifices to match Development Flight Instrumentation (DFI) port locations currently existing on the Space Shuttle Orbiter Columbia (OV-102). This DFI simulation has provided a means for comparisons between reentry flight pressure data and wind-tunnel data. Author

N83-29279# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
DEFENSE AGAINST SPACE WEAPONS
Zhao Xu and Fan Lusheng 24 Feb. 1983 9 p Transl. into ENGLISH from Hangkong Zhishi (China), no. 12, Dec. 1981 p 8-9
(AD-A126159; FTD-ID(RS)T-1384-82) Avail: NTIS HC A02/MF A01 CSCL 22/2

Observation is an important prerequisite for defense against space weapons and only if space weapons are observed in the vastness of space, their orbital parameters accurately determined, and they are able to be identified and destroyed will the necessary conditions be created. Consequently, systems for carrying out observation of space weapons occupy a special position in space defense deployment systems. GRA

N83-29280# Joint Publications Research Service, Arlington, Va.
USSR REPORT: SPACE, NO. 22
6 Jun. 1983 104 p Transl. into ENGLISH from various Russian articles
(JPRS-83612) Avail: NTIS HC A06

Progress in Russian aerospace science and technology is reported. Topics discussed include: manned missions; space science, satellite observations; interplanetary sciences; space engineering; space applications; and space policy and administration. For individual titles, see N83-29281 through N83-29290.

N83-29281# Joint Publications Research Service, Arlington, Va.
POST-FLIGHT INTERVIEW WITH BEREZEVOY AND LEBEDEV
V. Zubkov *In its* USSR Rept.: Space, No. 22 (JPRS-83612) 6 Jun. 1983 p 7-12 Transl. into ENGLISH from Sots. Industr. (Moscow), 26 Dec. 1982 p 4 (For primary document see N83-29280 18-12)
Avail: NTIS HC A06

The effects of long term space flights on cosmonauts, and on individual behavior was reported. The effects of a comfined quarters and the living with another human being in the small space are described. E.A.K.

N83-29282# Joint Publications Research Service, Arlington, Va.
OPTICAL ORIENTATION IN SPACE **c74**
V. Savinykh *In its* USSR Rept.: Space, No. 22 (JPRS-83612) 6 Jun. 1983 p 13-16 Transl. into ENGLISH from Aviatsiya i Kosmonavtika (Moscow), no. 1, Jan. 1983 p 42-43 (For primary document see N83-29280 18-12)
Avail: NTIS HC A06

An optical orientation device onboard the spacecrafts Vostok and Soyuz is discussed. The optical orientation device enables monitoring of the orientation across a broad range of angles of misalignment and docking. Statistical data are obtained for orientation monitoring above monotonous surfaces. The device also monitors orbital orientation on the vertical during nighttime, and uses lens screen against atmospheric emissive luminescence. E.A.K.

N83-29283# Joint Publications Research Service, Arlington, Va.
ROBOTS ON VENUS **c91**
V. G. Perminov and O. S. Fedorov *In its* USSR Rept.: Space, No. 22 (JPRS-83612) 6 Jun. 1983 p 25-32 Transl. into ENGLISH from Zemlya i Vselennaya (Moscow), no. 1, Jan. - Feb. 1983 p 32-36 (For primary document see N83-29280 18-12)
Avail: NTIS HC A06

The planning and design of the Venera, the automatic interplanetary station is discussed. The station is capable of transmitting information back to Earth. Venera will be used to explore the chemical composition, physical and mechanical properties of Venus' soil, and Venus' atmosphere. E.A.K.

N83-29284# Joint Publications Research Service, Arlington, Va.
BEREGOVOY ON FUTURE CONSTRUCTION IN SPACE
V. Skuratnik *In its* USSR Rept.: Space, No. 22 (JPRS-83612) 6 Jun. 1983 p 43-46 Transl. into ENGLISH from Stroit. Gazeta (Moscow), 29 Dec. 1982 p 4 (For primary document see N83-29280 18-12)
Avail: NTIS HC A06

A Russian science fiction novel published in 1920 is quoted at length and used as a basis for discussion of space engineering in the present and the future. Greenhouses in space, solar electric power stations, and cities in space are discussed. R.J.F.

N83-29285# Joint Publications Research Service, Arlington, Va.
REMOTE CONTROL OF ON-BOARD SATELLITE SYSTEMS **c15**

V. Olimpov and G. Irinin *In its* USSR Rept.: Space, No. 22 (JPRS-83612) 6 Jun. 1983 p 47-50 Transl. into ENGLISH from Aviatsiya i Kosmonavtika (Moscow), no. 6, Jun. 1982 p 44-45 (For primary document see N83-29280 18-12)
Avail: NTIS HC A06

The remote control of on-board satellite systems is discussed. Rigid and flexible programs are discussed, the flexible being preferred since the program can be changed during a radio communication session. The operation of a program timing unit consisting of a clock and a frequency splitter is discussed. R.J.F.

N83-29286# Joint Publications Research Service, Arlington, Va.
DYNAMICS OF OCEAN AND ATMOSPHERE ON BASIS OF OBSERVATIONS FROM SALYUT-6 **c43**
B. A. Nelepo, V. V. Kovalenok, G. K. Korotayev, and G. A. Grishin *In its* USSR Rept.: Space, No. 22 (JPRS-83612) 6 Jun. 1983 p 53-60 Transl. into ENGLISH from Zemlya i Vselsnnaya (Moscow), no. 1, Jan. - Feb. 1983 p 41-45 (For primary document see N83-29280 18-12)
Avail: NTIS HC A06

The application of space station and satellites to the study of ocean processes is discussed. Atmospheric circulation and ocean currents are discussed. Thermodynamic processes in the tropical zone, atmospheric instability, oceanic vortices, and oceanic internal waves are discussed. R.J.F.

N83-29287# Joint Publications Research Service, Arlington, Va.
FURTHER DEVELOPMENT OF KOSPAS-SALYUT SYSTEM **c15**
B. Konovalov *In its* USSR Rept.: Space, No. 22 (JPRS-83612) 6 Jun. 1983 p 61-64 Transl. into ENGLISH from Izvestiya (Moscow), 1 Apr. 1983 p 3 (For primary document see N83-29280 18-12)
Avail: NTIS HC A06

The KOSPAS-SARSAT satellite system is discussed. Tracking buoys that are launched at the time of an accident are described. A coastal station providing satellite communication with seagoing vessels is discussed. R.J.F.

N83-29288# Joint Publications Research Service, Arlington, Va.
USSR-INDIA COOPERATIVE SPACE PROGRAMS
Yu. Zaytsev *In its* USSR Rept.: Space, No. 22 (JPRS-83612) 6 Jun. 1983 p 75-77 Transl. into ENGLISH from Sov. Estoniya (Talliinn), 26 Jan. 1983 p 4 (For primary document see N83-29280 18-12)
Avail: NTIS HC A06

An account is given of U.S.S.R.-Indian cooperation in space. Joint satellite projects are discussed. R.J.F.

N83-29289# Joint Publications Research Service, Arlington, Va.
CONTRIBUTION OF SPACE PROGRAM TO NATIONAL ECONOMY **c85**
In its USSR Rept.: Space, No. 22 (JPRS-83612) 6 Jun. 1983 p 78-84 Transl. into ENGLISH from Ekonomich. Gazeta (Moscow), no. 12, Mar. 1983 p 2 (For primary document see N83-29280 18-12)
Avail: NTIS HC A06

The contribution of space science to the U.S.S.R. economy is discussed. Multispectral zone cameras and scanners are discussed. The use of space information for the preparation of geological maps and forest and crop inventories is discussed. Satellite observation of sea ice, forest and tundra fires, desert and pasture vegetation, and snow cover is discussed. R.J.F.

N83-29290# Joint Publications Research Service, Arlington, Va.
LEGAL DELIMITATION OF AIRSPACE **c84**
A. Terekhov *In its* USSR Rept.: Space, No. 22 (JPRS-83612) 6 Jun. 1983 p 85-87 Transl. into ENGLISH from Aviatsiya i Kosmonavtika (Moscow), no. 1, Jan. 1983 p 46-47 (For primary document see N83-29280 18-12)
Avail: NTIS HC A06

The problem of defining air space and outer space is discussed in the context of international law. The advent of space shuttles, which in their landing approach decend into air space, caused renewed interest in the problem. A U.S.S.R. proposed to the United Nations providing for a stage-by-stage solution to the problem of defining air space and outer space is discussed. R.J.F.

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

N83-29291# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. Mapping, Charting and Geodesy Div.
WATER PENETRATION PHOTOGRAMMETRY. VOLUME 1: FEASIBILITY AND EVALUATION STUDY Final Report
Robert M. Brown, Al Zied, Robert Arnone, Fred Townsend (Wisconsin Univ.), and Frank Scarpace (Wisconsin Univ.) Jan. 1983 81 p refs
(AD-A126209; NORDA-TN-186-VOL-1) Avail: NTIS HC A05/MF A01 CSCL 14/5

This report addresses the problem of near-shore bathymetry via automated digital processing of archived/future color aerial photography, examines both the photometric and environmental restrictions, and proposes new areas of research/algorithm development which, when integrated with existing digital techniques, could lead to the development of a system for processing the DMA archived and future color aerial photography. The advanced development effort being carried out by the NORDA Pattern Analysis Branch under this Water Penetration Photogrammetry (WPP) Subtask is planned to investigate the following areas: (1) Geometric (match point) techniques for stereo-bathymetry, e.g., correlation; (2) Density techniques to supplement the above stereo/geometric algorithms; (3) Automated identification and removal (where possible) of environmental artifacts and constraints in the imagery; (4) Use of image enhancement as an aid to the above items and for generating digitally improved photographs for conventional stereo compilations. GRA

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air).*

N83-29292*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ROLE OF SIMULATION AND EMULATION IN THE DEVELOPMENT OF SHUTTLE-CENTAUR (STS-CENTAUR)
Andrew L. Gordan Jul. 1983 22 p
(NASA-TM-83326; E-1568; NAS 1.15:83326) Avail: NTIS HC A02/MF A01 CSCL 22B

To support the task of integrating the Centaur liquid-fueled upper-stage space vehicle into the space shuttle program. A system to simulate and emulate the STS-Centaur avionic flight system and its supporting ground control and checkout equipment was selected and designated the systems integration facility (SIF). Located in San Diego, California, the SIF is composed of integrated simulators that form a composite control system complement to the STS-Centaur airborne and avionic support equipment. An off-line capability to verify the system design of the Centaur airborne support equipment (CASE) and the Centaur avionic flight system is provided as well as a realistic medium for the development and integration of ground checkout and airborne control software programs. Each simulator is composed of prototype hardware, where feasible, to maximize configuration likeness. Where emulated flight or ground hardware is used, it provides physical characteristics (loads, signals, etc.) equivalent to those of the flight hardware.

The hardware and software implementation of the SIF are described. A.R.H.

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N83-29293*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SATELLITE ORBIT PREDICTOR
Morton L. Friedman and James Garrett (AF) Jun. 1983 51 p
(NASA-TM-85015; NAS 1.15:85015) Avail: NTIS HC A04/MF A01 CSCL 22A

An analog aid is presented for determining the relationship between the SARSAT or COSPAS satellite orbit coverage of emergency locator transmitter/emergency position indicator radio beacon distress incidence. The predictor allows the user to quickly visualize the probability of a selected position being detected and is composed of a base map and a satellite track overlay for each satellite. A table of equator crossings for each satellite is included. Directions are given for using the predictor. A.R.H.

N83-29294*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE DRAG COEFFICIENT OF CYLINDRICAL SPACECRAFT IN ORBIT AT ALTITUDES GREATER THAN 150 KM
F. A. Herrero May 1983 39 p refs
(NASA-TM-85043; NAS 1.15:85043) Avail: NTIS HC A03/MF A01 CSCL 22B

The spacecraft of the Geopotential Research Mission (GRM) are cylindrical in form and designed to fly with their longitudinal axes parallel to their direction of flight. The ratio of length to diameter of these spacecraft is roughly equal to 5.0. Other spacecraft previously flown had corresponding ratios roughly equal to 1.0, and therefore the drag produced by impacts on the lateral surfaces of those spacecraft was not as large as it will be on the GRM spacecraft. Since the drag coefficient is essentially the drag force divided by the frontal area in flight, lateral impacts, when taken into account make the GRM drag coefficient significantly larger than the coefficients used before for shorter spacecraft. A simple formula is derived for the drag coefficient of a cylindrical body flying with its long axis along the direction of flight, and it is used to estimate the drag for the GRM. The formula shows that the drag due to lateral surface impacts depends on the ratio of length-to-diameter and on a coefficient C sub LS (lateral surface impact coefficient) which can be determined from previous cylindrical spacecraft flown with the same attitude, or can be obtained from laboratory measurements of momentum accommodation coefficients. Author

N83-29295# Naval Material Command, Washington, D. C. Translation Div.
TACTICAL MISSILE TECHNOLOGIES: THE EUROPEAN PERSPECTIVE
M. Allier 11 Jan. 1983 22 p Transl. into ENGLISH from l'Aeron. et l'Astronautique (France), no. 89, p 51-57
(AD-A126277; NISC-TRANS-6974) Avail: NTIS HC A02/MF A01 CSCL 16/4

Technological development in chemical propulsion, jet propulsion, airframes, warheads, electromagnetic sensors, inertial sensors, and data processing are discussed in relation to their impact on tactical missile systems. Performance characteristics and areas of application of the missiles, range of the missiles ('fire and forget' concept) and penetration of defenses, including counter-countermeasures are also discussed. S.L.

N83-29296# Analytic Sciences Corp., Reading, Mass.
MX SYSTEMS STUDY Final Report, 15 Jan. 1981 - 30 Sep. 1982
E. M. Duiven and R. F. Shipp 30 Nov. 1982 57 p refs
(Contract F04704-81-C-0003)
(AD-A126083; TASC-TR-3164) Avail: NTIS HC A04/MF A01 CSCL 16/1

This report summarizes the results of two investigations performed in support of the MX Full Scale Engineering Development program. The first investigation focused on alternative ways to present guidance system test data to enhance the effectiveness of preflight accuracy assurance procedures. The attributes of a desirable accuracy assurance system are discussed and the nature of the required structure and contents of such a system in the MX guidance context are defined. A review of the MX guidance production test structure is presented from which potential traceability parameters are then identified. The second investigation addressed the potential value of the SATRACK range instrumentation system to MX testing on the Western Test Range. Mathematical models describing the errors associated with the MX guidance system, the SATRACK system, and the environmental factors that affect system performance were developed. Particular attention was paid to the gravitational and ionospheric delay errors. GRA

N83-29285# Joint Publications Research Service, Arlington, Va.
REMOTE CONTROL OF ON-BOARD SATELLITE SYSTEMS
V. Olimpov and G. Irinin *In its* USSR Rept.: Space, No. 22 (JPRS-83612) 6 Jun. 1983 p 47-50 Transl. into ENGLISH from Aviatsiya i Kosmonavtika (Moscow), no. 6, Jun. 1982 p 44-45 (For primary document see N83-29280 18-12)
Avail: NTIS HC A06

N83-29287# Joint Publications Research Service, Arlington, Va.
FURTHER DEVELOPMENT OF KOSPAS-SALYUT SYSTEM
B. Konovalov *In its* USSR Rept.: Space, No. 22 (JPRS-83612) 6 Jun. 1983 p 61-64 Transl. into ENGLISH from Izvestiya (Moscow), 1 Apr. 1983 p 3 (For primary document see N83-29280 18-12)
Avail: NTIS HC A06

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

N83-29297*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SHUTTLE EVA DESCRIPTION AND DESIGN CRITERIA Final Report
May 1983 97 p refs
(NASA-TM-85355; JSC-10615-Rev-A; NAS 1.15:85355) Avail: NTIS HC A05/MF A01 CSCL 22A

The STS extravehicular mobility unit, orbiter EVA provisions, EVA equipment, factors affecting employment of EVA, EVA mission integration, baselined extravehicular activity are discussed. Design requirements are also discussed. Author

N83-29298*# National Aeronautics and Space Administration, Washington, D. C.
PROVING THE SPACE TRANSPORTATION SYSTEM: THE ORBITAL FLIGHT TEST PROGRAM
Tony Reichhardt [1982] 20 p
(NASA-FACTS-137-83; NAS 1.20:137-83) Avail: NTIS HC A02/MF A01 CSCL 22A

The main propulsion system, solid rocket boosters, external tank, orbital maneuvering system, spacecraft orbital operations (thermal tests, attitude control and remote manipulator), and return to Earth are outlined for the first four STS missions. Author

N83-29299# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
INTERACTIONS MEASUREMENTS PAYLOAD FOR SHUTTLE (IMPS) Final Report, 1 Nov. 1981 - 30 Sep. 1982

Henry Berry Garrett Hanscom AFB, Mass. AFGL Nov. 1982 70 p refs
(AF Proj. 7661)
(AD-A125841; AFGL-TR-82-0363) Avail: NTIS HC A04/MF A01 CSCL 22/2

The Interactions Measurements Payload for Shuttle (IMPS) is being developed by the Air Force Geophysics Laboratory (AFGL) to study interactions between large space vehicles such as the Shuttle and the low-altitude plasma environment over the polar-caps and in the auroral zone. This report details that plan and presents a long-range program for studying spacecraft interactions. The specific technology questions addressed in the IMPS mission are: what are the limits within which high voltage/high power systems can be operated without arcing or significant power loss, what hazards might hamper astronaut EVA in the auroral and polar-cap regions, can the deleterious effects of plasma interactions be limited, does passage through the auroral and polar-cap regions affect the shuttle-induced bay environment, and how do material properties change during a shuttle mission and do these changes alter shuttle interactions with the environment. Three versions of the IMPS payload capable of addressing these issues are presented. GRA

N83-29300# Weston Observatory, Mass.
AMPLITUDE AND PHASE OF SURFACE PRESSURE PRODUCED BY SPACE TRANSPORTATION SYSTEM: MISSION 5 Scientific Progress Report, Nov. 1982 - Jan. 1983
Francis A. Crowley, Eugene B. Hartnett, and Henry A. Ossing (AFGL) Hanscom AFB, Mass. AFGL Jan. 1983 68 p refs
(Contract F19628-81-K-0005; AF Proj. 7600)
(AD-A125846; AFGL-TR-83-0039; SR-3) Avail: NTIS HC A04/MF A01 CSCL 22/4

Surface pressures produced at distances of 150-300 meters from the launch of STS-5 are analyzed. The calculated attenuation, phasing and spacial coherence of surface pressure observations are consistent with the pressure produced by acoustics propagating outward from a single, small source moving with the rocket. The OASPL estimates for STS-5, calculated from standard form spectra, point to low acoustic efficiency or axially asymmetric acoustics for the shuttle. GRA

N83-29301# Erno Raumfahrttechnik G.m.b.H., Bremen (West Germany).
VIBRATION MEASUREMENT AND ATTENUATION FOR SPACELAB EXPERIMENTS OF THE D1 MISSION Final Report, Aug. 1981
Walter Knabe, Dirk Eilers, Hans-Reinhard Meyer-Piening, and Fromund Hock Bonn Bundesministerium fuer Forschung und Technologie Apr. 1983 105 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-83-003; ISSN-0170-1339) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 22

G-jitter spectral measurements results taken in the Spacelab Engineering Model (EM-1)/Long Module Configuration are presented, for the frequency band < 1 Hz to 200 Hz. The acceleration response of D1 experiment locations within, and at the base of the EM-1 Long Module was determined for full operation as well as for discrete partial operation modes of Spacelab. Responses to additional excitations corresponding to, or simulating, simple or typical forms of astronaut activity were analyzed. Perturbation sources and mechanisms of the D1 payload itself are identified. Specific D1 experiment which may be affected adversely, if not critically, by conceivable enhanced g-jitter levels during the mission are considered. It is concluded that for experiments sensitive to g-jitter perturbations at levels below 0.0001 g, the application of suitable vibration damping/insulating measures may be necessary. Author (ESA)

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

N83-29302*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MEMORY-BASED PARALLEL DATA OUTPUT CONTROLLER Patent Application
Raymond J. Strattel and James K. Niswander, inventors (to NASA) Filed 18 May 1983 20 p
(NASA-Case-GSC-12447-2; US-Patent-Appl-SN-501060) Avail: NTIS HC A02/MF A01 CSCL 09F

A memory-based parallel data output controller employs associative memories and memory mapping to decommutate multiple channels of telemetry data. The output controller contains a random access memory (RAM) which has at least as many address locations as there are channels. A word counter addresses the RAM which provides as its outputs an encoded peripheral device number and a MSB/LSB-first flag. The encoded device number and a bit counter address a second RAM which contains START and STOP flags to pick out the required bits from the specified word number. The LSB/MSB, START and STOP flags, along with the serial input digital data go to a control block which selectively fills a shift register used to drive the parallel data output bus. NASA

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

N83-29303* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SATELLITE RETRIEVAL SYSTEM Patent
Edwin C. Pruett (Essex Corp., Huntsville, Ala.), Kem B. Robertson (Essex Corp., Huntsville, Ala.), and Tomas E. Loughead, inventors (to NASA) (Essex Corp., Huntsville, Ala.) Issued 5 Jul. 1983 7 p Filed 30 Mar. 1981 Supersedes N81-24164 (19 - 15, p 2023) Sponsored by NASA
(NASA-Case-MFS-25403-1; US-Patent-4,391,423;
US-Patent-Appl-SN-248745; US-Patent-Class-244-161;
US-Patent-Class-244-115; US-Patent-Class-269-152;
US-Patent-Class-269-242; US-Patent-Class-269-244;
US-Patent-Class-294-86R) Avail: US Patent and Trademark Office CSCL 22B

A satellite retrieval system with first and second pairs of coacting parallel bars are separately mounted in spaced parallel planes on the front of a spacecraft. The bars of one pair are at right angles to bars of the other pair, and together the two pairs of bars effect a variable aperture adapted to close around a rod extending from a second spacecraft to effect the capture of the latter. Official Gazette of the U.S. Patent and Trademark Office

N83-29304*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
INTERACTIVE ANALYSIS OF A LARGE APERTURE EARTH OBSERVATIONS SATELLITE
Robert L. Wright, Dariene D. DeRyder, Melvin J. Ferebee, Jr., and John C. Smith May 1983 22 p refs
(NASA-TM-85638; NAS 1.15:85638) Avail: NTIS HC A02/MF A01 CSCL 22B

A system level design and analysis has been conducted on an Earth Observation Satellite (EOS) system using the Interactive Design and Evaluation of Advanced Spacecraft (IDEAS) computer-aided design and analysis program. The IDEAS program consists of about 40 user-friendly technical modules and an interactive graphics display. The reflector support system and feed mast of the EOS spacecraft are constructed with box-truss structural concept, a lattice configuration which can be packaged for delivery in a single Shuttle flight and deployed in orbit. The deployed spacecraft consists of a 120-m by 60-m parabolic focal axis. The spacecraft was modeled for structural, thermal, and control systems analysis and structural elements were designed. On-orbit dynamic and thermal loading analyses were conducted; spacecraft weights and developmental and first unit costs were determined. Author

N83-29305*# Vought Corp., Dallas, Tex.
DEVELOPMENT OF DEPLOYABLE STRUCTURES FOR LARGE SPACE PLATFORM SYSTEMS, VOLUME 2 Final Technical Report
R. L. Cox and R. A. Nelson 9 May 1983 115 p refs
(Contract NAS8-34678)
(NASA-CR-170800; NAS 1.26:170800; Rept-2-32300/3R-53434-Vol-2) Avail: NTIS HC A06/MF A01 CSCL 22B

Ground test article design, deployable volumes concept development, habitat and hangar conceptual designs, and deployable volumes analyses are addressed. Author

N83-29306*# McDonnell-Douglas Astronautics Co., Huntington Beach, Calif.
EVOLUTIONARY SPACE PLATFORM CONCEPT STUDY. VOLUME 2, PART 2: MANNED SPACE PLATFORM CONCEPTS Final Technical Report
May 1982 500 p refs
(Contract NAS8-33592)
(NASA-CR-170829; NAS 1.26:170829; MDC-H0072-Vol-2-Pt-B) Avail: NTIS HC A21/MF A01 CSCL 22B

Logical, cost-effective steps in the evolution of manned space platforms are investigated and assessed. Tasks included the analysis of requirements for a manned space platform, identifying alternative concepts, performing system analysis and definition of the concepts, comparing the concepts and performing programmatic analysis for a reference concept. Author

N83-29307# Lockheed Missiles and Space Co., Sunnyvale, Calif. Space Systems Div.
ACOSS TWELVE (ACTIVE CONTROL OF SPACE STRUCTURES) Interim Report, Aug. 1981 - Apr. 1982
Jean N. Auburn Griffiss AFB, N.Y. RADC Dec. 1982 100 p
(Contract F30602-81-C-0260; ARPA Order 3654; AF Proj. C654)
(AD-A126053; RADC-TR-82-320) Avail: NTIS HC A05/MF A01 CSCL 13/3

The objective of ACOSS is to develop and demonstrate the technology required to suppress vibrational disturbances (damping augmentation and elastic mode control) of large space structures so that they can meet the required line-of-sight and jitter control requirements. In this effort a control methodology is developed for disturbance rejection and an analysis is done for a sample surveillance structure, ACOSS-2. The work includes looking at robustness and assessing system identification methods. The theory is being applied to several bench top brassboards and these experiments are reported in detail. A proof-of-concept experiment will be conducted at RF tolerances and this five meter structure is reported on. GRA

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

No abstracts in this category.

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N83-29308*# United Technologies Research Center, East Hartford, Conn.
INVESTIGATION OF THE FEASIBILITY OF TEMPERATURE PROFILING OPTICAL DIAGNOSTICS IN THE SSME FUEL PRE-BURNER Final Technical Report, Aug. 1982 - Jun. 1983
J. A. Shirley Jun. 1983 56 p refs
(Contract NAS8-3477)
(NASA-CR-170799; NAS 1.26:170799; R83-956181F) Avail: NTIS HC A04/MF A01 CSCL 21H

Results of an analytical investigation to determine the feasibility of temperature profiling in the space shuttle main engine (SSME) fuel preburner are presented. In this application it is desirable to measure temperature in the preburner combustor with a remote, nonintrusive optical technique. Several techniques using laser excitation were examined with a consideration of the constraints imposed by optical access in the fuel preburner and the problems associated with operation near the functioning space shuttle engine. The potential performance of practical diagnostic systems based on spontaneous Raman backscattering, laser induced fluorescence, and coherent anti-Stokes Raman spectroscopy were compared analytically. A system using collection of spontaneous Raman backscattering excited by a remotely located 5 to 10 watt laser propagated to the SSME through a small diameter optical fiber was selected as the best approach. Difficulties normally associated with Raman scattering: weak signal strength and interference due to background radiation are not expected to be problematic due to the very high density in this application, and the low flame luminosity expected in the fuel rich hydrogen oxygen flame. S.L.

N83-29309# Air Force Rocket Propulsion Lab., Edwards AFB, Calif.
AFRPL TECHNICAL OBJECTIVE DOCUMENT FY 84
Robert I. Wiswell Dec. 1982 69 p Supersedes AFRPL-TR-82-004
(AD-A125495; AFRPL-TR-82-094; AFRPL-TR-82-004) Avail: NTIS HC A04/MF A01 CSCL 21/8

This report is a summary of technical objectives and approaches for research, exploratory development and advanced development efforts being pursued and to be pursued at the Air Force Rocket Propulsion Laboratory between FY 82-88.
Author (GRA)

N83-29310# Sandia Labs., Albuquerque, N. Mex.
FULL-SCALE TURBINE-MISSILE-CASING TESTS Final Report
H. R. Yoshimura and J. T. Schamaun Jan. 1983 188 p Sponsored by EPRI
(DE83-007427; EPRI-NP-2741) Avail: NTIS HC A09/MF A01

Results are presented of two full scale tests simulating the impact of turbine disk fragments on simple ring and shell structures that represent the internal stator blade ring and the outer housing of an 1800-rpm steam turbine casing. Benchmark data are provided on both the energy absorbing mechanisms of the impact process and, if breakthrough occurred, the exit conditions of the turbine

missile. A rocket sled was used to accelerate a 1527-kg (3366-lb) segment of a turbine disk, which impacted a steel ring 12.7 cm (5 in.) thick and a steel shell 3.2 cm (1.25 in.) thick. The impact velocity of about 150 m/s (492 ft/s) gave a missile kinetic energy corresponding to the energy of a fragment from a postulated failure at the design overspeed (120% of operating speed). Depending on the orientation of the missile at impact, the steel test structure either slowed the missile to 60% of its initial translational velocity or brought it almost to rest (an energy reduction of 65 and 100%, respectively). DOE

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N83-29311*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THE ADSORPTION AND THERMAL DECOMPOSITION OF TRICRESYLPHOSPHATE (TCP) ON IRON AND GOLD
Donald R. Wheeler and Owen D. Faut (Wilkes Coll.) 1983 17 p refs Presented at the 5th Symp. on Appl. Surface Analysis, Dayton, Ohio, 8-10 Jun. 1983; sponsored by Dayton Univ.
(NASA-TM-83341; E-1738; NAS 1.15:83341) Avail: NTIS HC A02/MF A01 CSCL 07E

Because tricresyl-phosphate (TCP) is a common antiwear additive in lubricants, there is great interest in its interactions with metal substrates. The TCP was allowed to adsorb on polycrystalline iron and gold at room temperature. X-ray photoelectron spectroscopy (XPS) was used to analyze the adsorbed species. The substrate was then heated in steps to 330 C, and the changes in the adsorbate were analyzed after each step. On both substrates saturation adsorption occurred at about one monolayer, but the sticking coefficient was less on gold than on iron. Comparison of the XPS spectra of TCP on each substrate with the spectrum from condensed TCP indicated nondissociative adsorption on gold, possibly by dipole-induced dipole interaction. On iron, there was apparently additional interaction between the substrate and the tolyl groups on the TCP molecule. TCP began to desorb molecularly from gold as soon as the gold was heated above room temperature. The desorption was complete by 200 C. However, when the iron substrate was heated, TCP did not desorb but decomposed between 150 and 250 C. S.L.

N83-29312# Pacific Northwest Lab., Richland, Wash. Biology and Chemistry Dept.
IDENTIFICATION AND COMPARATIVE GENOTOXICITY OF POLYCYCLIC AROMATIC HYDROCARBONS AND RELATED NITROGEN-CONTAINING HETEROATOMIC SPECIES IN PRODUCTS FROM COAL LIQUEFACTION PROCESSES
Douglas W. Later, Richard A. Pelroy, D. Dennis Mahlum, Cherylyn W. Wright, Milton L. Lee (Brigham Young Univ.), and Bary W. Wilson Feb. 1983 18 p refs Presented at the 7th Intern. Symp. on Polynucl. Aromatic Hydrocarbons, Columbus, Ohio, 26 Oct. 1982
(Contracts DE-AC06-76RL-01830; DE-AC02-79EV-10237)
(DE83-006939; PNL-SA-10869; CONF-8210100-2) Avail: NTIS HC A02/MF A01

A series of process distillation cuts from a solvent refined coal process were separated into polycyclic aromatic hydrocarbons (PAH) and nitrogen containing polycyclic aromatic hydrocarbons (N-PAC) chemical classes and the fractions tested for biological activity both microbial mutagenicity and mammalian skin carcinogenicity assays. Qualitative and quantitative chemical characterization of individual PAH and N-PAC in these materials was also performed. The results of biological and chemical analyses are presented and used to assess the comparative mutagenicity of the PAH and N-PAC from complex mixtures of coal liquefaction materials. Chemical class separation was obtained using adsorption column chromatography. Gas chromatography and mass spectroscopy were used to identify the fractions. DOE

24 COMPOSITE MATERIALS

Includes laminates.

N83-29313*# National Aeronautics and Space Administration, Washington, D. C.
STRUCTURE AND GROWTH PROCESS OF VAPOR-GROWN CARBON FIBERS
Tsuneo Koyama and Morinobu Endo Apr. 1983 22 p refs Transl. into ENGLISH from Oyo Butsuri (Japan), v. 42, no. 7, 1973 p 690-696 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-77046; NAS 1.15:77046) Avail: NTIS HC A02/MF A01 CSCL 11D

The structure, effect of heat, and growth process of vapor-grown carbon fibers are investigated. The growth process of the carbon fibers could be divided into three stages; nucleation, elongation, and thickening processes. Also, a multi-layered structure can be produced as well as graphitization. Author

N83-29314*# Northrop Corp., Hawthorne, Calif. Aircraft Div.
PERFORMANCE OF A QUANTITATIVE STUDY OF INSTABILITY-RELATED DELAMINATION GROWTH Final Report
R. L. Ramkumar Mar. 1983 98 p refs
(Contract NAS1-16727)
(NASA-CR-166046; NAS 1.26:166046; NOR-83-70) Avail: NTIS HC A05/MF A01 CSCL 11D

An experimental program was conducted to quantify instability-induced imbedded delamination growth. Static tests on double cantilever beam (DCB) specimens yielded the critical mode 1 strain energy release rate (G sub 1 C) for T300/5208 graphite/epoxy. Static tests on mixed mode cracked lap shear (CLS) specimens, and a nonlinear finite element analysis (NFEA) of the CLS specimen to separate mode 1 and mode 2 effects, yielded the critical mode 2 strain energy release rate (G sub 2 C) for T300/5208. Constant amplitude fatigue tests on DCB and CLS specimens, along with the NFEA results on CLS specimens, quantified mode 1 and mode 2 contributions to delamination growth rate. Fatigue tests were conducted at a frequency (omega) of 10 Hertz, maintaining the minimum to maximum cyclic load ratio (R) at 0.05. Static compression and constant amplitude compression fatigue tests were also conducted on specimens with imbedded through the width (ITTW) delaminations. Kapton imbeddments were located below 3, 4 or 6 plies in a 64-ply laminate, during layup, to simulate ITTW delaminations. Author

N83-29315*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
THE EFFECT OF EXTREME TEMPERATURES ON THE ELASTIC PROPERTIES AND FRACTURE BEHAVIOR OF GRAPHITE/POLYIMIDE COMPOSITES
D. H. Morris and R. A. Simonds Hampton, Va. NASA. Langley Research Center Jun. 1983 16 p refs
(Grant NsG-1571)
(NASA-CR-172143; NAS 1.26:172143) Avail: NTIS HC A02/MF A01 CSCL 11D

The influence of elevated and cryogenic temperatures on the elastic moduli and fracture strengths of several C6000/PMR-15 and C6000/NR-15082 laminates was measured. Tests were conducted at -157 C, 24 C, and 316 C (-250 F, 75 F, and 600 F). Both notched and unnotched laminates were tested. The average stress failure criterion was used to predict the fracture strength of quasi-isotropic notched laminates. Author

N83-29316# Wyoming Univ., Laramie. Dept. of Mechanical Engineering.
LAMINATE ANALYSES, MICROMECHANICAL CREEP RESPONSE, AND FATIGUE BEHAVIOR OF POLYMER MATRIX COMPOSITE MATERIALS Final Report, 16 Sep. 1979 - 30 Nov. 1982
Donald F. Adams Dec. 1982 66 p refs
(Contract DAAG29-79-C-0189)

(AD-A125784; UWME-DR-201-108-1; ARO-16370.10-MS) Avail: NTIS HC A04/MF A01 CSCL 11/4

Three major topics were pursued. The two dimensional finite element micromechanics analysis was extended to include nonlinear viscoelastic material response. Analytical predictions of the time-dependent behavior or both glass/epoxy and graphite/epoxy unidirectional composites subjected to transverse compression were then correlated with experimental data also generated as part of this study. The viscoelastic properties of the epoxy matrix were also determined, as required input to the analysis. A new three dimensional finite element analysis was developed, incorporating inelastic orthotropic material response, temperature and moisture-dependent material properties, and improved numerical solution techniques. This analysis is permitting the study of both micromechanical and laminate problems. GRA

N83-29317# General Dynamics Corp., Fort Worth, Tex.
SEM/TEM FRACTOGRAPHY OF COMPOSITE MATERIALS Final Technical Report, Oct. 1979 - Mar. 1982
K. M. Liechti, J. E. Masters, D. A. Ulman, and M. W. Lehman Wright-Patterson AFB, Ohio AFWAL Sep. 1982 101 p refs
(Contract F33615-79-C-5121; AF Proj. 2418)
(AD-A125832; AFWAL-TR-82-4085) Avail: NTIS HC A06/MF A01 CSCL 11/4

Basic unidirectional laminate and a simple quasi-isotropic laminate were mechanically tested to failure under tensile and compressive loads. A fractographic investigation of these specimens and specimens made available from Arcan shear tests. Mode 1 and Mode 2 fracture tests, three-point bend tests and low velocity impact tests was conducted. Procedures for conducting these analyses are defined and emphasize the need for considering information available from macroscopic as well as microscopic considerations. Fractographic features in the matrix material were found to provide more information on the failure process than fractographic features in the fibers. The brittle nature of the matrix material at room temperature resulted in fracture planes which were perpendicular to the local maximum principal stress direction. GRA

N83-29318# General Dynamics Corp., Fort Worth, Tex. Materials Research Lab.
CUMULATIVE DAMAGE MODEL FOR ADVANCED COMPOSITE MATERIALS Final Report, 23 Feb. 1981 - 23 May 1982
K. M. Liechti, K. L. Reifsnider, W. W. Stinchcomb, and D. A. Ulman Wright-Patterson AFB, Ohio AFWAL Jul. 1982 85 p refs
(Contract F33615-81-C-5049; AF Proj. 2419)
(AD-A126048; AFWAL-TR-82-4094; FZM-7074) Avail: NTIS HC A05/MF A01 CSCL 12/1

Test coupons, taken from laminates of structural significance, have been developed. Their design allowed for one geometry to be used in tensile and compressive testing at strains of importance in engineering design. The response of four laminates, made up of four different laminate stacking sequences, to quasi-static tension and compression and tension-tension, compression-compression and tension-compression loading was determined. Models for the prediction of strength and life of unnotched laminates under cyclic tensile and compressive loading have been developed. The models for tensile loading are essentially complete, although refinements may be made as the experimental data is interpreted. The models for compressive behavior are postulated but not complete in the sense that competing damage mode concepts have not yet been incorporated. A basic description of the philosophy behind the models, the approach for certain generic cases and some illustrative example calculations are presented. GRA

N83-29319# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
GRAPHITE ABLATION IN SEVERAL GAS ENVIRONMENTS
R. W. Newman and C. H. Hoshall Jan. 1983 40 p refs
(Contract N00024-83-C-5301)
(AD-A125511; JHU/APL/TG-1336) Avail: NTIS HC A03/MF A01 CSCL 11/4

The design of a passively cooled combustor for a hypersonic tactical missile poses many severe structural problems whose solutions are beyond the current state of the art. To design such a combustor, the designer must predict accurately the erosion rate of candidate materials so that a realistic balance can be achieved among weight, performance, and cost. To make these predictions, basic experimental data must be taken to determine ablation rates as a function of surface temperature, pressure, gas flow rate, and gas composition. An experimental procedure has been developed to obtain this information for graphite materials exposed to various gases, such as CO, CO2, argon, and H2O, and simulated Shelldyne H-air combustion products. The data agree well with data obtained from the literature and indicate that at temperatures above 3500 F (a) the ablation rate is diffusion limited, (b) CO2 in the stream reacts with carbon at the surface to form CO, and (c) water vapor reacts with the surface (this was not anticipated prior to the tests). At 2000 F, ablation is controlled by reaction rate, and both CO2 and water vapor in the stream react with the surface. Author (GRA)

N83-29320# Naval Research Lab., Washington, D. C.
COMPUTATION OF PROPAGATION SPEED AND REFLECTION OF AXIALLY SYMMETRIC WAVES IN COMPOSITE CYLINDERS WITH APPLICATION TO IMPEDANCE TUBE AND CALIBRATOR
Pieter S. Dubbelday and Clementina M. Ruggiero 25 Aug. 1982 77 p refs
(RR0110842)
(AD-A125875; NRL-MR-4885) Avail: NTIS HC A05/MF A01 CSCL 11/4

Waveguide theory is applied to the interpretation of data on reflection and propagation of sound in a water-filled impedance tube and in an acoustic calibrator. Computer programs are described and documented that: relate propagation speed and attenuation for the sample in the impedance tube to the complex reflection coefficient; relate propagation speed in the sample in the impedance tube to the elastic moduli of the sample material, both real and complex; and compute the propagation speed in the acoustic calibrator. A correction factor is developed to account for the lack of rigidity of the reflector in the impedance tube. The major conclusion with respect to the data reduction for the impedance tube is the observation that the relevant wave speed is not necessarily the dilatational wave speed, but is a function of the space between sample and tube wall. By modifying the experimental arrangement one may measure two separate elastic moduli. Author (GRA)

N83-29321# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
ANALYSIS OF REFRACTORY FIBER INSULATIONS AND HOT FACE COATINGS EXPOSED TO COAL-OIL MIXTURE COMBUSTION PRODUCTS
J. I. Federer Jul. 1982 68 p
(Contract W-7405-eng-26)
(DE82-018210; ORNL/TM-8243) Avail: NTIS HC A04/MF A01

Refractory fibrous aluminosilicate insulations with and without hot face coatings were exposed to the combustion products of a coal-oil mixture (COM) (90% No.6 residual oil and 10% coal) at about 1375 C for 496 h. Samples of each insulation and coating were analyzed to study the effects of fuel impurities on the materials. Uncoated aluminosilicate insulations containing about 50% Al2O3 performed as well as those containing about 80%. In both types, fuel impurities reacted with fibers and resulted generally in lower Al2O3 and higher Fe2O3, SiO2, and other impurities in the reaction layer on the surface of the specimens. The reaction layers, which were about 1 mm thick, consisted mostly of mullite and glass that contained Al, Ca, K, Si, and Ti. The glass in the reaction layers may have minimized penetration of fuel impurities. Most hot face coatings were restructured as a result of reaction with fuel impurities and exhibited increased in Fe2O3 and some other impurities. DOE

N83-29322# Rolls-Royce Ltd., Derby (England).
USE OF COMPOSITES IN AERO-ENGINES
I. J. Shellard 19 Nov. 1981 21 p refs Presented at Inst. of Phys., Mater. and Testing Group Meeting on Adv. Composites: Appl., Econ., and Develop., London
(PNR-90149; Reprint-840) Avail: NTIS HC A02/MF A01

Problems, in the performance of the materials and in the processing and manufacturing procedures, which limit the use of composites in aero-engines are discussed. The high manufacturing costs of composite components prevent the materials from being fully exploited in aero engines. The basis for these high costs is outlined, and changes in material types, material processing routes, component design and manufacturing methods which may lead to composite components which are cost competitive with the best metal alternatives are considered. One major limitation as compared with metals is the temperature capability of the resin matrix. Research on polymides and thermoplastic materials such as polyethersulphones is examined. The use of injection molding, and the advantages of higher fiber elongation and improved fiber transverse properties are discussed. Author (ESA)

N83-29323# INFOCOM, Crawley (England).
FOREIGN TECHNOLOGY ALERT-BIBLIOGRAPHY: CERAMICS, REFRACTORIES AND GLASS TECHNOLOGY Final Report, Jan 1980 - May 1982
Gordon Wilkinson 1982 30 p
(PB83-101642; INFO-FT/82-04) Avail: NTIS HC A03/MF A01 CSCL 11D

A systematically organized collection of abstracts from the NTIS bibliographic data base relating to high performance industrial materials based on ceramics, refractories and glass and describing work originating from countries outside the USA is provided. A tailored search of the data base was performed and the output carefully categorized, edited and indexed. The bibliography includes references to high performance ceramics based on zirconium, yttrium, thorium and other refractory materials fabricated from novel borides, carbides, carbonitrides, nitrides and oxides. Much of the foreign technology originates from Western Europe, particularly the Federal Republic of Germany. GRA

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

N83-29324* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
COOLING BY CONVERSION OF PARA TO ORTHO-HYDROGEN Patent
Allan Sherman, inventor (to NASA) Issued 12 Jul. 1983 9 p Filed 10 Sep. 1981 Supersedes N82-10358 (20 - 01, p 0052)
(NASA-Case-GSC-12770-1; US-Patent-4,393,039; US-Patent-Appl-SN-301075; US-Patent-Class-423-648R; US-Patent-Class-423-649) Avail: US Patent and Trademark Office CSCL 07D

The cooling capacity of a solid hydrogen cooling system is significantly increased by exposing vapor created during evaporation of a solid hydrogen mass to a catalyst and thereby accelerating the endothermic para-to-ortho transition of the vapor to equilibrium hydrogen. Catalyst such as nickel, copper, iron or metal hydride gels of films in a low pressure drop catalytic reactor are suitable for accelerating the endothermic para-to-ortho conversion.
Official Gazette of the U.S. Patent and Trademark Office

N83-29325*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
A SPILLAGE DETECTOR FOR LIQUID CHROMATOGRAPHY SYSTEMS Patent Application
Michael R. Jarvis (Illinois Univ.) and Donald S. Fulton, inventors (to NASA) (Illinois Univ.) Filed 23 Mar. 1983 27 p
(Contract NAS9-15328)
(NASA-Case-MSC-20206-1; US-Patent-Appl-SN-478129) Avail: NTIS HC A03/MF A01 CSCL 07D

A spillage detector device for use in conjunction with fractionation of liquid chromatography systems which includes a spillage receiving enclosure beneath the fractionation area is described. A sensing device having a plurality of electrodes of alternating polarity is mounted within the spillage receiving enclosure. Detection circuitry, responsive to conductivity between electrodes, is operatively connected to the sensing device. The detection circuitry feeds into the output circuitry. The output circuit has relaying and switching circuitry directed to a solenoid, and alarm system, and a pump. The solenoid is connected to the pliable conduit of the chromatography system. The alarm system comprises an audio alarm and a visual signal. A 115 volt power system is interconnected with the pump, the solenoid, the sensing device, and the detection and output circuitry (38). NASA

N83-29326*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
AN ELECTROCHEMICAL REBALANCE CELL FOR REDOX SYSTEMS Final Report
Dale K. Stalnaker Jun. 1983 15 p refs
(Contract DE-AI04-80AL-12726)
(NASA-TM-83363; E-1628; DOE/NASA/12726-20; NAS 1.15:83363) Avail: NTIS HC A02/MF A01 CSCL 10C

An electrochemical rebalance cell for maintaining electrochemical balance, at the system level, of the acidified aqueous iron chloride and chromium chloride reactant solutions in the redox energy storage system was constructed and evaluated. The electrochemical reaction for the cathode is Fe(+3) + e(-) yields Fe(+2), and that for the anode is 1/2H2 yields H(+) + e(-). The iron (carbon felt) electrode and the hydrogen (platinized carbon) electrode are separated by an anion exchange membrane. The performance of the rebalance cell is discussed as well as the assembly of a single rebalance cell and multicell stacks. Various cell configurations were tested and the results are presented and discussed. The rebalance cell was also used to demonstrate its ability, as a preparative tool, for making high purity solutions of soluble reduced metal ionic species. Preparations of titanium, copper, vanadium and chromium ions in acidified solutions were evaluated. Author

N83-29327# North Carolina Univ., Chapel Hill. Dept. of Chemistry.
CHEMICAL MODIFICATION OF CARBON ELECTRODES Final Technical Report
Royce W. Murray 31 Jan. 1983 8 p
(Contract N00014-76-C-0817)
(AD-A125964; TR-21) Avail: NTIS HC A02/MF A01 CSCL 07/4

This project had as its objectives the development of chemical and physical pathways to immobilize interesting chemicals on the surfaces of carbon electrodes, to develop surface analytical methods for the characterization of validation of surface immobilization procedures, to study the chemical and electrochemical behavior of the immobilized substances, and to exploit their chemical and electrochemical properties for electrocatalysis in various forms. GRA

N83-29328# Massachusetts Inst. of Tech., Cambridge. Dept. of Chemistry.
GEM-DIFLUOROALLYLLITHIUM: PREPARATION BY LITHIUM-HALOGEN EXCHANGE AND UTILIZATION IN ORGANOSILICON AND ORGANIC SYNTHESIS
Dietmar Seyferth, Robert M. Simon, Dennis J. Sepelak, and Helmuth A. Klein 23 Mar. 1983 39 p refs Submitted for publication
(Contract N00014-82-K-0322; NR Proj. 631-618)
(AD-A126094; TR-13) Avail: NTIS HC A03/MF A01 CSCL 07/3

GEM-Difluoroallyllithium may be generated by lithiumbromine

exchange between n-butyllithium and CH2=CHCF2Br at -95 degrees C using an in situ procedure. When this Li(C-F2CHCH2) preparation is carried out in the presence of chlorosilanes, aldehydes, ketones and esters, products of type R3Si-CF2CH=CH2, RCH(OH)CF2CH=CH2, RR'C-(OH)CF2CH=CH, respectively, are formed, often in good yield. The factors determining the regioselectivity in additions to C=0 of unsymmetrically substituted allylic lithium reagents are discussed. Author (GRA)

N83-29329# Naval Weapons Center, China Lake, Calif.
THE HYDROLYSIS OF PHOSPHATE ESTERS ON SOLIDS Interim Technical Report, 1 Oct. 1982 - 15 Jan. 1983
Richard A. Hollins 1 Feb. 1983 8 p refs Submitted for publication
(WR0130101; WR014110B; NR Proj. 633-846)
(AD-A126119; TR-1) Avail: NTIS HC A02/MF A01 CSCL 07/2

Several solid materials were examined for hydrolytic activity with organo-phosphorus esters. The solid systems consisted of aliphatic amines surface-immobilized on silica or alumina supports. All materials demonstrated rate enhancements for the hydrolysis of p-nitrophenyldiphenyl phosphate (NPDPP). GRA

N83-29330# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
THIRD ORDER POLARIZATION FOR MULTIFREQUENCY COHERENT ANTI-STOKES RAMAN SCATTERING Ph.D. Thesis
Robert F. Weber Sep. 1982 287 p refs
(AD-A125434; AFIT/DS/PH/82-2) Avail: NTIS HC A13/MF A01 CSCL 07/4

These two fields, the pump and Stokes fields, had their central frequencies separated by a Raman rotational-vibrational resonant frequency. The generated fields considered were also limited to two; an anti-Stokes and a second Stokes. GRA

N83-29331# Colorado School of Mines, Golden. Dept. of Chemical and Petroleum Refining Engineering.
MECHANISMS AND KINETICS OF COAL HYDROGENATION Quarterly Progress Report, Jan. - Mar. 1982
R. M. Baldwin May 1982 50 p refs
(Contract DE-AC22-79ET-14881)
(DE82-016296; DOE/ET-14881/9) Avail: NTIS HC A03/MF A01

When pyrite alone (2g) was employed as the additive, total conversion results were found to be comparable to the case with 2% H2S and no added pyrite. The increase in conversion at short residence time was again reflected most strongly in the presphaltene fraction. Gas on the reaction products after cooldown showed that H2S levels were about 0.03% when pyrite alone was the additive, and 0.3% when 2% H2S was the additive. No H2S was present in the reactor product gas for the baseline runs (no additives). The effect noted upon addition of pyrite thus may be explained by two entirely different catalytic mechanisms: a heterogeneous catalytic mechanism involving catalysis promoted by reduced pyrite; a homogeneous catalytic mechanism involving catalysis of hydrogen transfer by H2S released from the hydrogenated pyrite. Pyrite reduction to iron sulfide was previously shown to be very rapid at the temperatures employed. DOE

N83-29332# Pacific Northwest Lab., Richland, Wash.
PROGRESS IN STUDIES ON CATALYZED GASIFICATION OF WOOD
L. K. Mudge, E. G. Baker, R. J. Robertus, and M. D. Brown 16 Mar. 1983 40 p refs Presented at the 15th Biomass Thermoconversion Contractors' Meeting, Atlanta, 16-17 Mar. 1983
(Contract DE-AC06-76RL-01830)
(DE83-009124; PNL-SA-11190; CONF-830323-1) Avail: NTIS HC A03/MF A01

Technical and economic feasibility of producing specific gas products via the catalytic gasification of biomass was evaluated. Laboratory studies, process development, and economic analyses were performed. The laboratory studies were conducted to develop operating conditions and catalyst systems for generating methane rich gas, synthesis gases, hydrogen, and carbon monoxide and to gain a fundamental understanding of process chemistry. The process development unit (PDU), previously used for tests at atmospheric pressure, was operated at absolute pressures of up to 10 atm (1000 kPa). A program for use on a microcomputer was written to determine the effect of yield changes at elevated pressures on process economics. Results of these studies confirm the favorable economics for generation of methanol from wood. As yet, catalyst life in the PDU was not as long as expected from laboratory studies. Process operations in a large scale fluid bed are technically feasible. DOE

N83-29333# Bend Research, Inc., Oreg.
COUNTERCURRENT REVERSE OSMOSIS FOR ETHANOL-WATER SEPARATION Final Report, 7 Aug. 1981 - 6 Nov. 1982
E. K. L. Lee, W. C. Babcock, and P. A. Bresnahan Mar. 1983 66 p refs
(Grant DE-FG07-81ID-12320)
(DE83-009725; DOE/ID-12320/T1) Avail: NTIS HC A04/MF A01

The technical and economic feasibility of producing concentrated ethanol from dilute feedstocks using a membrane process called countercurrent reverse osmosis (CCRO) was investigated. A number of commercial membranes prepared in our laboratory for their suitability for CCRO application were evaluated. Included were some of the best RO membranes currently available for desalination. In all cases the membranes exhibited decreasing ethanol-water selectivities with increasing ethanol concentration in the feed stream, becoming essentially non-selective toward a 50 to 60 vol % ethanol feed. Thus, it appears that even with state of the art membranes, concentration of ethanol above 50 vol % is not possible. Various degrees of degradation were observed among the membranes. To test the feasibility of using CCRO to reduce osmotic pressure across the membranes, experiments were performed in which ethanol solutions were introduced on the permeate side of the membrane. DOE

N83-29334# Kansas State Univ., Manhattan.
DIFFUSION-FLAME STUDIES OF THE CHEMICAL AND PHYSICAL MECHANISMS OF SOOT FORMATION FROM AROMATIC AND SUBSTITUTED-AROMATIC FUELS Progress Report, 16 Feb. 1982 - 15 Feb. 1983
T. W. Lester, J. F. Merklin, and C. M. Sorensen Mar. 1983 32 p refs
(Contract DE-AC02-80ER-10677)
(DE83-009093; DOE/ER-10677/5) Avail: NTIS HC A03/MF A01

The measurement of the diffusion constants of soot aerosols in both laminar premixed and diffusion flames and on preliminary analysis of the influence of the presence of cyclohexane on the decomposition of and soot formation from benzene was reported. The diffusion coefficients of aerosol particles in the intermediate Knudsen number regime were measured with the use of the dynamic light scattering technique Photon Correlation Spectroscopy. The experimental values, obtained in flame generated aerosols as well as polystyrene microsphere aerosols, are compared to the diffusion coefficients theoretically predicted. These simple theories are in error by up to an order of magnitude, and over predict the diffusion constants for the aerosol particles in both the flame generated aerosols and the polystyrene microsphere aerosols. A speculative hypothesis is put forth that retains these theories as a limiting case for larger particles in this intermediate region. DOE

N83-29335# Purdue Univ., Lafayette, Ind. School of Chemical Engineering.
CO + H SUB 2 REACTIONS OVER NITROGEN-MODIFIED IRON CATALYSTS Quarterly Technical Progress Report, 1 Aug. - 31 Dec. 1982
W. Nicholas Delgass 1982 25 p refs
(Grant DE-FG22-82PC-50804)
(DE83-006579; DOE/PC-50804/1) Avail: NTIS HC A02/MF A01

The effects of nitrogen, as nitride and as a gas phase reactant, on hydrocarbon synthesis reactions over iron catalysts was examined. In this first quarterly period of a three year program,

two students were assigned to the project and began assimilation of the literature and upgrading of equipment. Initial Mossbauer spectroscopic and kinetic experiments on bulk iron nitrides show our ability to prepare and identify the (BETA) prime-Fe4N phase and follows its stability during Fischer-Tropsch synthesis. Kinetic and characterization experiments is the major emphasis of this first phase of the work. DOE

N83-29336# SRI International Corp., Menlo Park, Calif.
RECOVERY OF HYDROGEN FROM HYDROGEN SULFIDE: BENCH SCALE STUDIES OF THE REACTION OF HYDROGEN SULFIDE WITH LIQUID COPPER Final Report
G. N. Krishnan and D. L. Hildenbrand May 1982 114 p refs
(Contract DE-AC02-76CH-00016)
(DE83-005947; BNL-51624) Avail: NTIS HC A06/MF A01

A bench scale study was conducted to examine the rate of reaction of hydrogen sulfide with liquid copper for the purpose of recovering hydrogen from hydrogen sulfide. The reaction rate at 1200 C was rapid and that the conversion of hydrogen sulfide to hydrogen approached the equilibrium level of 99.7%. The rate and the conversion remained constant until nearly all the copper was converted to cuprous sulfide. Using a model based on the Cu-S phase diagram, it was concluded that the gas phase mass transport was the rate controlling step during most of the reaction period. Preliminary technical and economic assessments were performed for a hydrogen recovery process based on liquid copper and cuprous sulfide intermediates. DOE

N83-29337# Sandia Labs., Albuquerque, N. Mex.
RELATIVE CATALYTIC ACTIVITY OF IRON CONTAINING MINERALS FOR THE HYDROGASIFICATION OF COAL
Thomas D. Padrick, James K. Rice, and Thomas M. Massis 1982 7 p refs Presented at the Am. Chem. Soc. Symp. on Coal Liquefaction, Kansas City, Mo., 1 Sep. 1982
(Contract DE-AC04-76DP-00789)
(DE82-012776; SAND-82-0642C; CONF-820909-3) Avail: NTIS HC A02/MF A01

Investigation of the catalytic activity of several iron compounds on hydrogasification of coal showed that catalytic activity is dependent on the particular iron compound with the following order observed: Fe2O3 > Fe3O4 > FeSO4 > FeS2 > FeO > Fe. Results of two series of experiments performed to aid in interpreting this dependence of reduced iron catalytic activity on precursor species are described. The assumption was made that the role of reduced iron in catalyzing hydrogasification is dissociation of H2. Also, there was evidence that catalysts affected gasification by physical interaction with the coal. Hydrogen transfer activity of the reduced iron state for six iron containing minerals were measured. Each mineral resulted in a different active site density. The nitrogen BET surface area and total pore volume on coal char samples with added iron containing minerals were measured. Again, each mineral affected the physical structure of the char differently. DOE

N83-29338# General Atomic Co., San Diego, Calif.
DYE LASER FLUORESCENCE SPECTROSCOPY ON THE DOUBLET 3 TOKAMAK
C. H. Muller, III, D. R. Eames, K. H. Burrell, and S. C. Bates (ORNL) May 1982 21 p refs Presented at the 5th Intern. Conf. on Plasma Surface, Gatlinburg, Tenn., 3 May 1982
(Contract DE-AT03-76ET-51011)
(DE82-017575; GA-A-16736; CONF-820545-16) Avail: NTIS HC A02/MF A01

Measurements of edge-region TiI impurity densities and central region deuterium (n=2) densities were obtained in the Doublet 3 Tokamak using laser induced fluorescence spectroscopy. TiI densities range from 10 to the 12th power to 10 to the 13th power cu m in ohmically heated D2 discharges and a factor of 2 to 5 times less in H2 discharges. Edge region TiI equilibration times following neutral beam injection are in good agreement with central region ion confinement times suggesting that energetic charge exchange neutrals from the plasma center are responsible for TiI impurities. Resonance fluorescence scattering from deuterium atoms in the plasma center were observed using a broadband (8 nm) dye laser source and a narrow band detector to investigate the feasibility of determining ion temperatures. DOE

N83-29339# Oak Ridge National Lab., Tenn.
INTERNATIONAL SURVEY OF THE STATUS OF TECHNOLOGY OF CRITICAL COMPONENTS FOR COAL-LIQUEFACTION PROCESSES
W. R. Williams, T. B. Conley, T. L. Dahl, and K. O. Johnsson Jun. 1982 78 p
(Contract W-7405-eng-26)
(DE82-015236; ORNL/ENG-EM-24) Avail: NTIS HC A05/MF A01

The subject survey considers three categories of components: slurry letdown valves, slurry pumps, and heat transfer equipment (slurry preheaters and exchangers and gasifier waste heat boilers). Foreign technology is similar to US technology and that both foreign and domestic manufacturers are hindered by: (1) a lack of adequate design correlations partially because of proprietary restrictions; and (2) uncertainties in demonstration and commercialization schedules. Solutions to slurry letdown valve and slurry pump problems, which are only now being developed in the United States, were used as far back as the 1940s in German liquefaction plants and today are being incorporated into equipment selected and installed in several foreign pilot plants. DOE

N83-29340# Mound Lab., Miamisburg, Ohio.
OXYGEN DIFFUSION OF ANODIC SURFACE OXIDE FILM ON TITANIUM STUDIED BY AUGER ELECTRON SPECTROSCOPY
Pu Sen Wang, T. N. Wittberg (Dayton Univ.), and R. G. Keil (Dayton Univ.) 1982 16 p refs Presented at the 8th Intern. Pyrotechnics Symp., Steamboat Springs, Colo., 12 Jul. 1982
(Contract DE-AC04-76DP-00053)
(DE82-013653; MLM-2934; CONF-820710-1) Avail: NTIS HC A02/MF A01

TiO2 films of about 10000 A were grown onto titanium foils anodically under galvanostatic conditions at 20 mA/square cm in saturated aqueous solutions of ammonium tetraborate. The samples were then aged at 450, 500, and 550 C, and oxygen diffusion was observed by Auger electron spectroscopy (AES) profilings. The oxygen diffusivities were calculated by Fick's Second Law, using the Boltzmann-Matano solution, to be 9.4 x 10 to the -17 power, 2.6 x 10 to the -16 power, and 1.2 x 10 to the -15 power, 500, and 550 C, respectively. The diffusivities obtained by this method were also compared with those obtained using an exact solution to Fick's Second Law. The activation energy was calculated to be 30 kcal/mole. DOE

N83-29341# Oak Ridge National Lab., Tenn. Health and Safety Research Div.
RAPID-SCREENING-LUMINESCENCE TECHNIQUES FOR TRACE ORGANIC ANALYSIS
T. Vo-Dinh 1982 22 p refs Presented at the 33rd Pittsburgh Conf. on Anal. Chem. and Appl. Spectroscopy, Atlantic City, 8 Mar. 1982
(Contract W-7405-eng-26)
(DE82-017518; CONF-820381-2) Avail: NTIS HC A02/MF A01

An overview of the principles and applications of two spectroscopic methods, e.g., synchronous luminescence (SL) and room temperature phosphorescence (RTP), used as rapid screening tools for monitoring polynuclear aromatic compounds in real life samples is provided. Two practical examples, a screening procedure of various coal products and a characterization procedure of the total particulate matter from cigarette smoke condensates, illustrate the efficacy of the SL and RTP techniques. Other applications of the SL and RTP techniques in the areas of environmental and industrial process control are also reviewed. DOE

N83-29342# Argonne National Lab., Ill.
ACCELERATOR MASS SPECTROMETRY: FROM NUCLEAR PHYSICS TO DATING
Walter Kutschera 1982 27 p refs Presented at the 11th Intern. Radiocarbon Conf., Seattle, 20-26 Jun. 1982
(Contract W-31-109-eng-38)

(DE83-007863; CONF-8206163-1) Avail: NTIS HC A03/MF A01

The use of acceleration orginally intended for nuclear physics to do high resolution mass spectrometry for the purpose of isotope dating and age estimation of materials are discussed. DOE

N83-29343# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.

METAL COORDINATION CHEMISTRY: REMOVAL AND RECOVERY OF METAL COMPOUNDS FROM HEAVY CRUDE AND SHALE OILS WITH MULTIDENTATE LIGANDS Annual Report, Oct. 1981 - Oct. 1982

Richard H. Fish Dec. 1982 140 p refs

(Contract DE-AC03-76SF-00098)

(DE83-006912; LBL-15398) Avail: NTIS HC A07/MF A01

Progress reports are presented for the following tasks: (1) speciation of inorganic and organoarsenic compounds in retort waters, shale oil and Green River Formation oil shale; (2) synthesis of organoarsenic and inorganic arsenic catecholates as models for removal of organoarsenic and inorganic arsenic compounds from retort recovery products such as shale oil and retort water; (3) preparation of polymer bonded catechols for reaction studies with organoarsenic and inorganic arsenic compounds; (4) molecular characterization and fingerprinting of vanadyl porphyrin and nonporphyrin compounds found in various heavy crude petroleums and their asphaltenes; (5) synthesis of model vanadyl non-porphyrin compounds for comparison to those found in various heavy crude petroleums. In addition, 16 papers presented at meetings during 1980 to 1982, and 75 papers published during 1981 to 1982 are listed. DOE

N83-29344# Rockwell International Corp., Golden, Colo. Energy Systems Group.

PROCESS FOR PRODUCING OXYGEN

Takesaburo Furukawa Feb. 1983 5 p Transl. into ENGLISH of Japanese Patent Publ. No. 53-29312, (1978)

(Contract DE-AC04-76DP-03533)

(DE83-006648; RFP-Trans-358) Avail: NTIS HC A02/MF A01

This invention concerns a process for efficiently collecting oxygen from the air. According to the findings, if air is brought into contact with natural zeolite whose moisture content was reduced to lower than 1% by calcination, together with additional anisotropic ferrite magnet, nitrogen is efficiently and selectively adsorbed on the natural zeolite while oxygen is attracted to the anisotropic ferrite magnet and prevented from being adsorbed on the zeolite. Oxygen at a concentration of 88% is obtained. DOE

N83-29345# Brandeis Univ., Waltham, Mass. Dept. of Chemistry.

ACTIONOMETRY IN MONOCHROMATIC FLASH PHOTOLYSIS: THE EXTINCTION COEFFICIENT OF TRIPLET BENZOPHENONE AND QUANTUM YIELD OF TRIPLET ZINC TETRAPHENYL PORPHYRIN

John K. Hurley, Naomi Sinai, and Henry Linschitz 15 Nov. 1982 22 p refs

(Contract DE-AC02-76ER-03117)

(DE83-006819; DOE/ER-03117/25; COO-3117-25) Avail: NTIS HC A02/MF A01

The extinction coefficient epsilon sub T, of triplet benzophenone in benzene was directly determined by absolute measurements of absorbed energy and triplet absorbance, delta D(o) sub T, under demonstrably linear conditions where incident excitation energy, E sub 0, and ground state absorbance, A sub 0, are both extrapolated to zero. The result 7220 + or - 320 1/m 1/cm at 530 nm, validates and corrects many measurements of triplet and radical extinctions and yields, using the energy transfer method. As E sub 0 and A sub 0 both decrease, delta D(0) sub T becomes proportional to their product. In this situation, the ratio R = (1/A sub 0) (d delta D (0) sub T/ d E sub 0) = (epsilon sub Tepsilon sub G) phi sub T. Measurements of R, referred to benzophenon, give (epsilon sub T - epsilon sub 6) phi sub T for any substance, without necessity for absolute energy calibration. Both absolute and relative laser flash measurements on zinc tetraphenyl porphyrin (epsilon sub T - epsilon sub G at 470 nm = 0.00073 1/m 1/cm) give phi sub T = 0.83 + or - 0.04. DOE

N83-29346# Brown Univ., Providence, R. I. Div. of Engineering.

CHARACTERIZATION OF TAR PRODUCTS FROM RAPID PYROLYSIS OF BITUMINOUS COALS Quarterly Progress Report, Oct. 1982 - Dec. 1982

E. M. Suuberg and P. E. Unger 1982 8 p refs

(Grant DE-FG22-81PC-40803)

(DE83-007272; DOE/PC-40803/T5; QPR-5) Avail: NTIS HC A02/MF A01

The role of mass transfer in shaping the pyrolysis behavior of softening coals is stressed. The molecular weight distribution data obtained as has given us new insights into such processes. Tar yields are increased by factors which tend to increase the rate of escape of tars from the particle (e.g., performing the pyrolysis at reduced pressures, or using small particles). Increased rates of escape allow the tar precursor species less residence time within the particle, which means that they have less time to be repolymerized into the char fraction of the particle. The newly obtained tar molecular weight distribution data have suggested the necessity of developing a model of pyrolysis which explicitly accounts for mass transfer limitations within the particle. These limitations most likely arise from liquid phase diffusional processes rather than pore diffusional processes. DOE

N83-29347# Deutsche Gold- und Silber-Scheideanstalt, Frankfurt am Main (West Germany). Fachbereich Forschung Metall.

RECOVERY OF PRECIOUS METALS FROM CYANIDE SOLUTIONS, PLATING BATHS AND LIQUID RESIDUES FROM HOMOGENEOUS CATALYSIS PROCESSES Final Report, Jan. 1981

Hermann Renner and Wolfgang Zilske Bonn Bundesministerium fuer Forschung und Technologie Mar. 1983 74 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-83-030; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 15,50

The recovery of precious metals from cyanide solutions is described. Thermal hydrolysis of complex cyanides of gold, silver and other heavy metals leads to rapid decomposition above 250C. Cyanide hydrolyzes to form ammonia and formiate. The metal is reduced and precipitates as sludge. The technical feasibility of the process was shown at a pilot plant. Heavy metals and cyanide are nearly entirely removed so that the solutions require neutralization only. Thermal hydrolysis with subsequent reduction is not applicable to rhodium containing residues from homogeneous catalysis processes. The recovery of precious metals remains incomplete. Author (ESA)

N83-29348# Princeton Univ., N. J. Dept. of Mechanical and Aerospace Engineering.

STUDIES OF DRY-POWDER EXTINGUISHMENT OF DIFFUSION FLAMES FOR CONDENSED FUELS Final Technical Report

Joseph W. Peters 15 Jun. 1982 126 p refs

(Contract N81-NADA-2041)

(PB83-150656; NSB-GCR-82-412) Avail: NTIS HC A07/MF A01 CSCL 21B

A powder delivery system for the extinction of diffusion flames of condensed fuels is studied. The main component of the delivery system is a glass elutriation vessel containing a bed of powder. The main component of the delivery system is a glass elutriation vessel containing a bed of powder. The extinction experiments were conducted in counterflow flame geometry. A flat diffusion flame was producted in a stagnation point boundary layer by directing an oxidizing gas stream downward onto the surface of a liquid fuel burning at atmospheric pressure. The extinction data can be used to extract overall activation energies and prefactors for the inhibition processes in one step reaction rate approximations, perhaps ultimately leading to conclusions regarding chemical mechanisms for powder suppression. GRA

N83-29349# Energy and Environmental Research Corp., Irvine, Calif.
PROCEEDINGS OF THE FIFTH FUNDAMENTAL COMBUSTION RESEARCH CONTRACTORS WORKSHOP
M. P. Heap, comp. Jan. 1983 643 p Workshop held in Newport Beach, Calif., 23-25 Jan. 1980
(Contract EPA-68-02-2631)
(PB83-164483; EPA-600/9-83-001) Avail: NTIS HC A99/MF A01 CSCL 21B

A review of EPA's Fundamental Combustion Research (FCR) Program by EPA's Science Advisory Board was provided. The workshop sessions dealt with gas phase chemistry and heterogeneous NO reduction, chemical and physical effects of thermal decomposition, bench scale reactor studies, two phase turbulent flames, and model development. The main thrust of EPA's FCR program is elucidating the mechanism of NO formation from fuel bound nitrogen. Several papers addressed the gas phase conversion of fuel nitrogen species to NO, N2, HCN, or NH3. Advanced diagnostic techniques were used to investigate the physical changes taking place during the thermal decomposition of pulverized coal particles. GRA

N83-29350# Colorado School of Mines, Golden.
LIQUID-VAPOR EQUILIBRIA FOR TERNARY NATURAL GAS SYSTEMS Annual Report, Sep. 1981 - Sep. 1982
A. J. Kidnay and E. D. Sloan Oct. 1982 83 p refs Sponsored by Gas Research Inst.
(PB83-173419; GRI-83-0001) Avail: NTIS HC A05/MF A01 CSCL 07D

Vapor-liquid equlibria were measured for the binary systems methane + carbon dioxide at 230, 250 and 270 K; methane + ethane at 210, 230, 250 and 270 K; and ethane + carbon dioxide at 210, 213, 230 and 250 K. The ternary system methane + ethane + carbon dioxide was studied at 230 K over the pressure range 1.15 MPa to 6.59 MPa. The Peng-Robinson equation of state was used to model the experimental data with an accuracy sufficient for most engineering calculations. Preliminary studies were made of the solid-liquid-vapor equilibria for the binary systems methane + carbon dioxide and ethane + carbon dioxide. GRA

N83-29351# Denver Univ., Colo. Dept. of Chemistry.
PRECONCENTRATION METHODS FOR TRACE ELEMENT DETERMINATION Final Report, May 1979 - May 1982
Donald E. Leyden Mar. 1983 92 p refs
(Grant EPA-R-806520)
(PB83-172536; EPA-600/4-83-006) Avail: NTIS HC A05/MF A01 CSCL 07D

The literature to determine methods of trace element preconcentration that could be used realistically for sample preparation for trace element determinatons in drinking, natural and/or effluent waters was reviewed. Elements included in the USEPA's listing of Priority Pollutants, with the exception of beryllium, were chosen for the study. Once the methods were identified, those deemed most promising for application to the simultaneous determination of trace elements using energy-dispersive X-ray fluorescence (EDXRF) spectrometry were to be evaluated. Several criteria were used such as the number of elements recovered, linear dynamic range, accuracy and precision, sensitivity-recovery, resistance to interferences and overall ruggedness of the method. GRA

N83-29352# Norwegian Hydrodynamic Labs., Trondheim.
GAS/LIQUID SEPARATION IN TRANSIENT FLOW PRE-PROJECT
K. A. Selanger, O. Oldervik, P. O. Tjelflaat, and T. K. Nielsen 30 Jun. 1982 124 p refs
(PB83-171041; NHL-2-82053; STF60-A82053;
ISBN-82-595-2887-8) Avail: NTIS HC A06/MF A01 CSCL 07D

The acquisition of experimental data on combined vaporization and gas release/absorption in hydrocarbon fluids when exposed to pressure transients is described. The data obtained can be applied in a numerical model simulating pressure transients in a pipenet. Plans and results from modelling work and literature studies are discussed. GRA

N83-29353# Central Inst. for Industrial Research, Oslo (Norway).
SUPERACIDS AS CATALYSTS FOR SELECTED HYDROCARBON CONVERS
Elizabeth B. Ofstad Feb. 1983 57 p refs Transl. into ENGLISH of "Supersyrer som Katalysatorer for Utvalgte Hydrokarbonreaksjoner" Norway, Mar. 1982 43 p
(PB83-166546; Rept-81-03-08-4) Avail: NTIS HC A04/MF A01 CSCL 07D

Liquid and solid superacids and their use as catalysts for selected hydrocarbon conversions are described. Reaction mechanisms are outlined, and literature data concerning reaction rate, conversion, selectivity, product composition, etc., is referred. The reaction types mainly considered are those of greatest importance for future chemical industrial utilization of natural gas, i.e., reactions involving light alkanes. GRA

N83-29354# Environmental Protection Agency, Research Triangle Park, N.C. Environmental Monitoring Systems Lab.
NATIONAL PERFORMANCE AUDIT PROGRAM: THE 1980 PROFICIENCY SURVEY FOR SULFUR DIOXIDE, NITROGEN DIOXIDE, CARBON MONOXIDE, SULFATE, NITRATE, LEAD AND HIGH VOLUME FLOW
Berne I. Bennett, Robert L. Lampe, Linda F. Porter, Avis P. Hines, and John C. Puzak Oct. 1982 60 p refs
(PB83-164863; EPA-600/4-82-045) Avail: NTIS HC A04/MF A01 CSCL 07D

Periodic surveys of analytical proficiency for sulfur dioxide, nitrogen dioxide, carbon monoxide, sulfate, nitrate, lead, and high volume flow are administered. Sample materials and devices that were utilized (performance audits) were developed to simulate collected air pollution samples as faithfully as possible. Integrity of the various sample materials is continuously monitored to ascertain stability, accuracy, uniformity, and representativeness of the pollutant concentrations. Since a major survey objective is the assessment of routine analytical performance, a brief evaluative report is promptly returned to each participant. A comprehensive report contains a summary of survey results. GRA

N83-29355# National Bureau of Standards, Boulder, Colo. National Engineering Lab.
MEMBRANE SEPARATIONS IN CHEMICAL PROCESSING
Thomas M. Flynn and J. Douglas Way Dec. 1982 28 p refs
(PB83-165068; NBSIR-82-1675) Avail: NTIS HC A03/MF A01 CSCL 07A

Rapidly rising energy and operating costs have underscored the need for energy efficient separations processes, such as membrane processes, which avoid the energy consuming phase change step of many conventional separations. Membrane separation is the most energy efficient separation technique thermodynamically possible, since it does not rely upon vaporization and condensation to effect fractionation. Recent developments in solid polymer, hollow fiber and liquid membranes give excellent promise for industrial application. Because of recent technological developments of these new membranes, and its great energy savings potential, research is conducted on the fundamentals determining separation rates, separation factors, and selectivity of new types of solid and liquid membranes. GRA

N83-29227*# Washington Univ., Seattle.
FAST COMPUTATIONAL KINETICS PROGRAM
David T. Pratt *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 183-198 refs (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 21B

N83-29228*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FLAME RADIATION MEASUREMENTS

R. W. Claus, F. M. Humenik, and G. M. Neeley *In its* Combust. Fundamentals Res. Mar. 1983 p 199-206 refs (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 21B

N83-29229*# Northwestern Univ., Evanston, Ill.
LEAN LIMIT PHENOMENA
C. K. Law *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 207-219 refs (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 21B

N83-29230*# Princeton Univ., N. J.
COUPLING OF TRANSPORT AND CHEMICAL PROCESSES IN CATALYTIC COMBUSTION
F. V. Bracco, C. Bruno, B. S. H. Royce, D. A. Santavicca, N. Sinha, and Y. Stein *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 221-234 (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 21B

N83-29231*# Purdue Univ., Lafayette, Ind.
SPONTANEOUS IGNITION CHARACTERISTICS OF HYDROCARBON FUEL-AIR MIXTURES
Arthur H. Lefebvre and Greg W. Freeman *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 235-238 refs (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 21B

N83-29233*# California Univ., Berkeley.
NUMERICAL MODELING OF TURBULENT COMBUSTION
A. F. Ghoneim, A. J. Chorin, and A. K. Oppenheim *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 249-263 refs (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 21B

N83-30033*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
MINERAL SEPARATION IN A CELSS BY ION-EXCHANGE CHROMATOGRAPHY
E. Vernon Ballou, LeRoy A. Spitze, Frankie W. Wong, Theodore Wydeven, and Catherine C. Johnson *In its* Controlled Ecol. Life Support System Dec. 1982 p 60-69 refs Prepared in cooperation with San Jose State Univ., Calif. (For primary document see N83-30016 18-54)
Avail: NTIS HC A05/MF A01 CSCL 07D

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N83-29356*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
MICROFISSURING OF INCONEL 718 Interim Report
A. C. Nunes, Jr. Jun. 1983 27 p refs
(NASA-TM-82531; NAS 1.15:82531) Avail: NTIS HC A03/MF A01 CSCL 11F

A tentative mathematical computer model of the microfissuring process during electron beam welding of Inconel 718 has been constructed. Predictions of the model are compatible with microfissuring tests on eight 0.25-in. thick test plates. The model takes into account weld power and speed, weld loss (efficiency), parameters and material characteristics. Besides the usual material characteristics (thermal and strength properties), a temperature and grain size dependent critical fracture strain is required by the model. The model is based upon fundamental physical theory (i.e., it is not a mere data interpolation system), and can be extended to other metals by suitable parameter changes. Author

N83-29357 Oregon Graduate Center for Study and Research, Beaverton.
EFFECT OF MICROSTRUCTURE AND INTERNAL HYDROGEN ON FATIGUE CRACK PROPAGATION OF ULTRAHIGH STRENGTH STEELS Ph.D. Thesis
Narayana Sastry Cheruvu 1980 187 p
Avail: Univ. Microfilms Order No. DA8300035

The effect of microstructure and internal hydrogen or fatigue crack propagation of quenched and tempered AISI 4340 steel was investigated. The microstructural variables viz., prior austenite grain size, substructure of martensite, retained austenite and type of carbides were altered by choosing various austenitizing temperatures and tempering temperatures. Optical metallography and transmission electron microscopy were used to characterize these microstructural variables. Significant amounts of retained austenite firms were observed at the lath and prior austenite grain boundaries, particularly in the coarse grained structures. The retained austenite was mechanically unstable ahead of a crack tip, and as well as during tensile deformation under plane stress and plane strain conditions. The microstructural variations that were induced by various heat treatments used in this study did not significantly affect the threshold stress intensity for fatigue crack growth. Crack growth rates near threshold stress intensity and at intensity and at intermediate stress intensity ranges were nearly independent of microstructure. However, the specimens with higher fracture toughness exhibited better resistance to crack growth at high sizes intensity ranges than the specimens with lower fracture toughness. Dissert. Abstr.

N83-29358*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
REACTIONS OF NaCl WITH GASEOUS SO3, SO2, AND O2
W. L. Fielder, C. A. Stearns, and F. J. Kohl Washington 1983 19 p refs Presented at the 163d Meeting of the Electrochem. Soc., San Francisco, 9-13 May 1983
(NASA-TM-83423; E-1712; NAS 1.15:83423) Avail: NTIS HC A02/MF A01 CSCL 11F

Hot corrosion of gas turbine engine components involves deposits of Na2SO4 which are produced by reactions between NaCl and oxides of sulfur. For the present investigation, NaCl single crystals were exposed at 100 to 850 C to gaseous mixtures of SO3, SO2, and O2. The products formed during this exposure depend, primarily, on the temperatures. The four product films were: NaCl-SO3; Na2S2O7; Na2SO4; and NaCl-Na2SO4. The kinetics of the reactions were measured. Author

N83-29359*# Southwest Research Inst., San Antonio, Tex.
EVALUATION OF FUEL ADDITIVES FOR REDUCTION OF MATERIAL IMCOMPATIBILITIES IN METHANOL-GASOLINE BLENDS Final Report
Charles F. Rodriguez, J. G. Barbee, W. K. Knutson, and J. P. Cuellar, Jr. Mar. 1983 41 p refs
(Contracts DEN3-287; DE-AI01-81CS-50006)
(NASA-CR-168061; DOE/NASA/0287-1; NAS 1.26:168061; SwRI-7080) Avail: NTIS HC A03/MF A01 CSCL 11F

Screening tests determined the efficacy of six commercially available additives as modifiers of methanol's corrosivity toward metals and its weakening of tensile properties of nonmetals in automotive fuel systems. From the screening phase, three additives which seemed to protect some of the metals were tested in higher concentrations and binary combinations in search of optimal application conditions. Results indicate that two of the additives have protective properties and combining them increases the protection of the metals corroded by methanol-gasoline blends. Half of the metals in the tests were not corroded. Testing at recommended concentrations and then at higher concentrations and in combinatioins shows that the additives would have no protective or harmful effects on the nonmetals. Two additives emerged as candidates for application to the protection of metals in automotive methanol-gasoline fuel systems. The additives tested were assigned letter codes to protect their proprietary nature.
A.R.H.

N83-29360*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
CONSIDERATIONS OF TECHNOLOGY TRANSFER BARRIERS

IN THE MODIFICATION OF STRATEGIC SUPERALLOYS FOR AIRCRAFT TURBINE ENGINES
Joseph R. Stephens and John K. Tien (Columbia Univ., New York) 1983 25 p refs Presented at the 112th Ann. Meeting of the Am. Inst. of Mining, Metall. and Petroleum Engr., Atlanta, 7-10 May 1983
(NASA-TM-83395; E-1672; NAS 1.15:83395) Avail: NTIS HC A02/MF A01 CSCL 11F

A typical innovation-to-commercialization process for the development of a new hot section gas turbine material requires one to two decades with attendant costs in the tens of millions of dollars. This transfer process is examined to determine the potential rate-controlling steps for introduction of future low strategic metal content alloys or processes. Case studies are used to highlight the barriers to commercialization as well as to identify the means by which these barriers can be surmounted. The opportunities for continuing joint government-university-industry partnerships in planning and conducting strategic materials R&D programs are also discussed. Author

N83-29361# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
EFFECT OF THE TEST ENVIRONMENT ON CREEP CRACK GROWTH RATES FOR NICKEL BASE ALLOYS. A STUDY OF CREEP CRACK GROWTH IN 2219-T851 ALUMINUM ALLOY USING A COMPUTERIZED TESTING SYSTEM Annual Report
Regis M. Pelloux, Kenneth R. Bain, and Philippe L. Bensussan Feb. 1983 76 p refs
(Grant AF-AFOSR-0087-82)
(AD-A125698; AFOSR-83-0107TR) Avail: NTIS HC A05/MF A01 CSCL 11/6

A two part research program was conducted to study the mechanics of creep crack growth in (1) nickel base superalloys as a function of alloy chemistry and test environment at 704 degrees C; (2) a high strength aluminum alloy 2219-T851 at 175 degrees C. The creep crack growth rate data is reported and analyzed in terms of fracture mechanics parameters. The automated test procedures used for the aluminum alloys is discussed in detail in view of the need for standardized testing procedures to measure creep crack growth rates. GRA

N83-29362# Drexel Univ., Philadelphia, Pa. Dept. of Materials Engineering.
A FUNDAMENTAL STUDY OF TOOL STEELS PROCESSED FROM RAPIDLY SOLIDIFIED POWDERS Annual Report, 1 Oct. 1981 - 30 Sep. 1982
A. Lawley and M. J. Koczak Jan. 1983 101 p refs
(Contract N00014-81-K-0039)
(AD-A126163) Avail: NTIS HC A06/MF A01 CSCL 11/6

A detailed microstructural examination has been made of T15 and Rex 25 high speed tool steels processed from rapidly solidified powders. Gas atomized powders were screened into selected size fractions, hot isostatically pressed to full density and heat-treated. Two HIPing temperatures, two austenitizing temperatures and three tempering temperatures were included in the study. Atomized and consolidated materials were characterized by means of optical and electron microscopy, X-ray diffraction and hardness. Both cellular and dendritic structures are present in the atomized powders depending on particle size, with MC carbides present primarily at cell boundaries. The partitioning of alloying elements in the cell structure decreases with decreasing particle size. Independent of prior particle size fraction, the carbide size distribution after HIPing is skewed to larger carbide sizes with increasing HIPing temperature, but with no significant change in volume fraction of carbides. At a given HIPing temperature the carbide size distribution for MC and M6C carbides is dependent on prior particle size fraction; it is broader for the coarser size fractions. GRA

N83-29363# Naval Postgraduate School, Monterey, Calif. Dept. of Mechanical Engineering.
THE EFFECTS OF GRAIN SIZE ON THE MARTENSITIC TRANSFORMATION IN COPPER-ZINC-ALUMINUM SHAPE MEMORY ALLOYS M.S. Thesis
Timothy James Gann Dec. 1982 64 p refs
(AD-A126056) Avail: NTIS HC A04/MF A01 CSCL 11/6

The effect of grain size on the martensitic transition in a Cu-Zn-Al alloy was studied. As grain size increases, the martensite phase is stabilized relative to the parent phase, as indicated by an increase in the martensite start temperature (Ms). Martensite stabilization due to thermal cycling is also corroborated. A method of grain refinement is introduced which will consistently yield grain sizes of less than 0.1 millimeters. Author (GRA)

N83-29364# Northwestern Univ., Evanston, Ill. Dept. of Materials Science.
CHANGES IN RESIDUAL STRESS, DOMAIN SIZE AND MICROSTRAIN DURING FATIGUE OF 1008 STEEL Technical Report
H. K. Kuo (National Sun Yat-Sen Univ.) and J. B. Cohen 1 Mar. 1983 34 p refs
(Contract N00014-80-C-0116; Grant NSF DMR-76-80847)
(AD-A126058; TR-9) Avail: NTIS HC A03/MF A01 CSCL 11/6

Changes in the positions and shapes of X-ray diffraction peaks have been examined after low-cycle and high-cycle strain-controlled fatigue of normalized and cold-worked 1008 steel. Measurements were made at and below the surface. Domain (mosaic) size is sometimes the major contributor to peak breadth, but sometimes it is controlled by microstrain, or by both quantities. Microstrains are larger after low-cycle fatigue than after high-cycle fatigue. The surface residual stress is altered by fatigue, and the pattern of change with cycling is similar for low or high strains, and for initially normalized or cold-worked specimens. Near failure in low-cycle fatigue of a cold-worked specimen, the domain size and microstrain approach those for a (cycled) annealed specimen. Dislocation densities are the order of 10 to the 13th power -10 to the 14th power per sq m. Cycling in the initially normalized condition increases both the dislocation density and dislocation arrangements with long-range strain. However, with cold-worked 1088 steel, the density decreases and, near failure, the dislocation array is nearly random. In all cases, the peak breadth passes through a minimum vs. depth below the surface. GRA

N83-29365# General Electric Co., Schenectady, N. Y. Properties Branch.
SEM (SCANNING-ELECTRON-MICROSCOPY) STUDIES OF MAGNETIC DOMAINS IN AMORPHOUS METALS Annual Report, 1 Dec. 1981 - 30 Nov. 1982
J. D. Livingston 31 Jan. 1983 21 p refs
(Contract N00014-82-C-0060)
(AD-A126070; REPT-83-SRD-013) Avail: NTIS HC A02/MF A01 CSCL 11/6

Magnetic domain structures in transverse-annealed amorphous ribbons were characterized by SEM. Effects of ribbon width, anisotropy constant, ac and dc magnetic fields, and applied fields were demonstrated. Results were related to magnetic and magnetomechanical properties. Author (GRA)

N83-29366# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
REMOVAL OF HYDROGEN FROM PLATED HIGH STRENGTH STEEL BY BAKING: A STATISTICALLY DESIGNED STUDY Progress Report
D. A. Berman 19 Nov. 1982 19 p refs
(WR02201001)
(AD-A126100; NADC-82238-60) Avail: NTIS HC A02/MF A01 CSCL 12/1

Statistically designed screening experiments were conducted to determine the significance of various parameters on the hydrogen content of bright and dull cadmium plated 4340 steel after baking. It was shown that the baking time was essentially the only significant variable in determining the final hydrogen concentration as determined by the barnacle electrode. However, variations between batches were found to be significant for the dull cadmium plated material. Author (GRA)

N83-29367# Puerto Rico Univ., Rio Piedras. Dept. of Physics.
A MICROSCOPIC MODEL FOR THE LIQUID METAL: IONIC SOLUTION INTERFACE Interim Technical Report
J. P. Badiali (Paris VI Univ.), M. L. Rosinberg (Paris VI Univ.), F. Vericat (IFLYSIB), and L. Blum 10 Feb. 1983 30 p refs Submitted for publication
(Contract N00014-81-C-0776; Grant NSF KE-80-01969; NR Proj. 051-775)
(AD-A125531; TR-6) Avail: NTIS HC A03/MF A01 CSCL 11/6

A microscopic model for the metal solution interface is presented, which for the first time, includes both a nonideal treatment of the metal and a molecular model for the solution side. The metal is described by a jellium including electron ion pseudopotential. The solution is treated as a mixture of hard spheres with point dipoles (solvent molecules) or point charges (ions). The statistical mechanics is solved using the mean spherical approximation. No a priori separation is introduced between compact and diffuse layers. A simplified version of the model is applied to the case of Hg-DMSO systems. Author (GRA)

N83-29368# Northwestern Univ., Evanston, Ill. Dept. of Materials Science and Engineering.
LOCAL DEFECT ARRAYS AND PROPERTIES OF OXIDES Final Report, 24 Oct. 1979 - 24 Dec. 1982
J. B. Cohen, D. E. Ellis, M. E. Fine, and T. O. Mason 28 Feb. 1983 7 p refs
(Contract DAAG29-80-C-0035)
(AD-A125927; ARO-16740.11-MS) Avail: NTIS HC A02/MF A01 CSCL 07/2

This project was an interdisciplinary effort attempting to quantify the relationships between the electrical and magnetic properties of transition metal oxides and their local defect arrangements. Highly specialized X-ray techniques were applied to establish defect structures in materials where electrical properties or magnetic properties were also studied. Quantum theoretical modelling of defect structures was also initiated. GRA

N83-29369# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Materials Engineering.
MICROSTRUCTURE AND FATIGUE BEHAVIOR OF 3 NICKEL BASE EUTECTIC COMPOSITES Technical Report, 1 Dec. 1981 - 30 Nov. 1982
K. A. Dannemann, N. S. Stoloff, and D. J. Duquette 30 Nov. 1982 169 p refs
(Grant AF-AFOSR-0015-80; AF Proj. 2306)
(AD-A125571; AFOSR-83-0059TR; TR-3) Avail: NTIS HC A08/MF A01 CSCL 11/6

The high cycle fatigue behavior of three advanced unidirectionally solidified nickel-base eutectic alloys has been studied. AG-170, strengthened by Alpha-Mo fibers, and brittle carbide reinforced Nitac 14B and Cotac 744 were tested in vacuum under axial tension-tension, sinusoidal loading at 20 Hz. Fatigue properties of the as D.S. and heat treated conditions were examined at both 25 deg C and 825 deg C. In addition, the effects of reduced frequency on the high temperature fatigue life of aged Nitac 14B have been determined. Fatigue resistance of the as D.S. material decreased between 25 deg C and 825 deg C. This has been related to a variation in the mode of cracking. Room temperature failures were surface initiated and propagation proceeded along crystallographic planes, whereas Stage 2 crack propagation was observed at 825 deg C. Nitac 14B was shown to be superior at both temperatures owing to its high matrix strength and large Gamma' volume fraction. The elevated temperature fatigue life of aged Nitac 14B was substantially reduced at low test frequencies in vacuum. The decrease in frequency caused a shift from surface initiated failure to an almost featureless fracture surface where the initiation, fatigue, and overload zones were not easily identified. Reduced specimen life was postulated to be the result of enhanced creep. GRA

N83-29370# Mound Lab., Miamisburg, Ohio.
HYDROGEN ATTACK OF BAINITIC 2 1/4 Cr-1Mo STEEL
C. M. Woods and T. E. Scott (Anaconda Aluminum Co.) 1982 43 p refs Presented at the 15th Ann. Intern. Metallographic Soc. Meeting, Orlando, Fla., 18 Jul. 1982
(Contract DE-AC04-76DP-00053)
(DE82-019169; MLM-2968(OP); CONF-820724-4) Avail: NTIS HC A03/MF A01

Smooth bar and notched bar tensile specimens of normalized and tempered (bainitic) 2 1/4 Cr-1 Mo steel were exposed to hydrogen gas at 5.2 to 27.6 Mpa in the temperature range from 482 to 593 C. Polished and etched surfaces as well as fracture surfaces obtained by fracturing the samples at liquid nitrogen temperature were examined for methane bubble formation in the SEM. Tensile tests were performed at room temperature on exposed samples. The formation of bubbles was found to be sensitive to changes in both the temperature and hydrogen pressure for any given exposure time. Applied stress, plastic deformation and longer exposure times all lowered the temperature necessary, at any given pressure, for the formation of bubbles. DOE

N83-29371# Argonne National Lab., Ill. Materials Science and Technology Div.
RADIATION-INDUCED MICROSTRUCTURAL CHANGES IN Ni-C AND Pt-C ALLOYS
P. G. Regnier (Centre d'Etudes Nucleairs de SacLay, Gif-sur-Yvette, France) and N. Q. Lam Nov. 1982 5 p refs Presented at the Intern. Conf. on Dimensional Stability and Mech. Behavior of Irradiated Metals and Alloys, Brighton, Engl., 11 Apr. 1983 Submitted for publication Sponsored in part by Commissariat a l'Energie Atomique, France
(Contract W-31-109-eng-38)
(DE83-007815; CONF-830418-1) Avail: NTIS HC A02/MF A01

Microstructural changes in Ni-C and Pt-C alloys under irradiation inside a high voltage electron microscope were investigated as a function of energy and temperature. Two main aspects of microstructural damage by electron irradiation at energies below the displacement threshold of the host elements are discussed: direct displacement of light C solutes by the incident electrons and indirect displacement of heavy Ni and Pt atoms by secondary C-solvent atom collisions. Insights into the mechanisms that lead to the formation of defect aggregates in interstitial alloys during subthreshold energy irradiation are provided. DOE

N83-29372# California Univ., Livermore. Lawrence Livermore Lab.
PROTECTING AGAINST FAILURE BY BRITTLE FRACTURE IN FERRITIC-STEEL SHIPPING CONTAINERS GREATER THAN 4 INCHES THICK
M. W. Schwartz Dec. 1982 48 p refs
(Contract W-7405-eng-48)
(DE83-007462; UCRL-53045) Avail: NTIS HC A04/MF A01

This report presents methods for protecting against brittle fracture spent fuel shipping containers made from ferritic steel forgings greater than four in. thick. Both fracture arrest and fracture initiation criteria were examined as bases for establishing requirements for the design and selection of materials for shipping containers. This report also includes a discussion of the brittle fracture sensitivity of the containers to various processes used in container fabrication. DOE

N83-29373# Argonne National Lab., Idaho Falls, Idaho.
OXYGEN AND TITANIUM SPUTTERING YIELDS AS DETERMINED BY LASER FLUORESCENCE AND AUGER ELECTRON SPECTROSCOPY FOR MONOLAYER OXYGEN COVERAGE OF POLYCRYSTALLINE TI
M. J. Pellin, C. E. Young, M. H. Mendelsohn, D. M. Gruen, R. B. Wright, and A. B. DeWald (Georgia Inst. of Tech., Atlanta) 1982 22 p refs Presented at the 5th Intern. Conf. on Plasma Surface, Gatlinburg, Tenn., 3-7 May 1982
(Contract W-31-109-eng-38)
(DE83-007683; CONF-820545-22) Avail: NTIS HC A02/MF A01

The presence of an oxide layer can strongly influence the charge-state of species ejected from ion-bombarded metal surfaces, as well as the total sputtering yield. These quantities

directly affect the influx of metallic impurities from the wall region into the plasmas of fusion devices. Surface coverage can also modify the distribution of sputtered atoms among electronic states and thus the apparent impurity density detected by the laser fluorescence spectroscopy (LFS) technique. The measurements reported here provide LFS data on number density and electronic state populations for the species Ti and Ti(+) as a function of surface oxygen coverage in a laboratory apparatus providing for direct monitoring by Auger analysis. DOE

N83-29374# Technische Hochschule, Darmstadt (West Germany). Inst. fuer Werkestoffkunde.

STRUCTURE AND PROPERTIES OF NICKEL-BORON-LAYERS Final Report, Aug. 1981

Helmut Speckhardt and Klaus Stallmann Bonn Bundesministerium fuer Forschung und Technologie Dec. 1982 103 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-241; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 22

The influence of bath composition, roughness of the substrate metal surface and of pretreatment on the structure of electroless deposited nickel-boron coatings and the distribution of the alloying components are studied. Hardness and toughness of the deposits, fatigue and corrosion fatigue behavior of plated steel specimens, and the variation of these values by heat treatment after deposition are described. Author (ESA)

N83-29375# Siemens A.G., Munich (West Germany). Werk Halbleiter.

MICROELECTRONIC POSITION SENSORS Final Report, Jun. 1981

Ewald Pettenpaul, Wolfgang Flossmann, Helmut Freller, and Wilhelm Kuny Bonn Bundesministerium fuer Forschung und Technologie Apr. 1983 188 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-83-034; ISSN-0340-7608) Avail: NTIS HC A09/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 39,50

Implanted GaAs Hall devices of planar technology without mesa etching, but with gold-based metallization systems were developed. Their reliability was checked up to an ambient temperature of 180 C. A differential sensor allows rotational speed detecting of gears up to air gaps of 1.7 mm. Different versions of multiple light barriers were developed. For optical crosstalk problems between neighboring tracks, InSb-Hall devices were made on ferrite substrate with a vapor deposited, recrystallized active layer. The assembly is effective using micropack technology on dual-S-8 film. The profile height of 0.4 mm as well as the mechanical and thermal stabilities of the devices are in accordance with the requirements regarding collectorless motors. Author (ESA)

N83-29376# Heraeus (W. C.) G.m.b.H., Hanau (West Germany).

PALLADIUM ELECTROLYTES FOR USE IN SELECTIVE PLATING PROCESSES Final Report, Dec. 1980

Konrad Wundt, Michael Branik, and Heinrich Meyer Bonn Bundesministerium fuer Forschung und Technologie Mar. 1983 59 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-83-024; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 12,50

The development of an aqueous palladium electrolyte not containing ammonia, for use in selective plating processes is reported. The deposition of pure palladium layers was effected from compounds of palladium(II) with a polyamine as complexing ligand. The metal concentration was 6 to 25 g/l. The amine was added in an amount corresponding to a molar proportion of amine to palladium of 1:1 to 3:1. Besides the amine and the palladium(II)-compound the electrolytes contained conductivity and/or buffer salts, surfactants and brightners. Formulations for the laboratory scale which allow the deposition on nickel of adherent palladium layers virtually free of pores at current densities up to 1.5 A/dsqm and small electrolyte speed were developed, but they do not meet the quality standards of high speed selective plating. Author (ESA)

N83-29377# Deutsche Gold- und Silber-Scheideanstalt, Frankfurt am Main (West Germany). Fertigungstechnik Metall.

GAS TURBINE PARTS MADE OF INJECTION MOLDED SILICON NITRIDE AND BRAZING OF SILICON NITRIDE WITH METAL Final Report, Feb. 1980

Ekkehard Lange and Norbert Mueller Bonn Bundesministerium fuer Forschung und Technologie Mar. 1983 36 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-83-028; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 7,50

The fabrication of turbine blades and turbine vanes, the fabrication of turbine parts with larger volumes and the brazing of silicon nitride and metal are considered. Densities up to 2. g/cucm, bending strength values up to 330 MN/sqm, and Weibull values between m = 10 and 20 are reached with silicon nitride parts. Spin tests confirm expectations. The injection molding technique of turbine parts with larger volume was studied. Recommendations are given for brazing alloys and brazing components for joining silicon nitride with metal. Author (ESA)

N83-29378# Grumman Aerospace Corp., Bethpage, N.Y.

REDUCED-POLLUTION CORROSION-PROTECTION SYSTEMS Final Report, 1 Aug. 1976 - 31 Dec. 1979

Christian J. Staebler, Jr. and Bonnie F. Simpers Jan. 1983 117 p refs

(Grant EPA-R-804331)

(PB83-153056; EPA-600/2-83-002) Avail: NTIS HC A06/MF A01 CSCL 11C

Coating systems, designed to protect metallic components against corrosive attack using environmentally compatible materials and processes, were evaluated as potential alternatives for their higher polluting counterparts. Viable replacements were established for cyanide cadmium, cyanide copper, and hexavalent chromium electroplating. Alternatives to solvent borne plants and phenolic type paint strippers are available with slightly lower performance characteristics than their higher polluting counterparts. Performance characteristics were established for replacement systems of each type through comprehension testing. The performance, economic, and environmental aspects of the new coating systems were compared to those for a currently used control system. GRA

N83-29379# Bureau of Mines, Salt Lake City, Utah.

LINE-SINTER PROCESSING OF ANORTHOSITE FOR THE RECOVERY OF ALUMINA Investigations Report, 1982

V. E. Edlund 1982 27 p

(PB83-148435; BM-RI-8714) Avail: NTIS HC A03/MF A01 CSCL 11F

A line sinter, caustic leach technology for anorthosite was investigated for recovering alumina from domestic nonbauxite resources. Unit operations: feed preparation, sintering, and leaching were discussed. B.G.

N83-29380# Municipal Environmental Research Lab., Cincinnati, Ohio. Drinking Water Research Div.

CORROSION CONTROL: WHY THE LABORATORY NEEDS TO BE INVOLVED

Gary S. Logsdon 1982 9 p refs Presented at the 10th Water Quality Technol. Conf., Nashville, Dec. 1982; sponsored by American Water Works Association Submitted for Publication

(PB83-152009; EPA-600/D-82-358) Avail: NTIS HC A02/MF A01 CSCL 11F

The investment made in water distribution system piping and service lines and in building plumbing totals many billions of dollars. The decay and disintegration of America's public works facilities is a popular topic now. Although the situation is not so drastic for

water utilities as it is for roads and bridges, water utilities must not neglect their investment. Corrosion control can prolong the life of water mains and plumbing. The water utility laboratory has a key role in testing water quality to assess its corrosive nature, in evaluating pipes and plumbing for effects of corrosion, in testing corrosion control strategies for their efficacy, and in monitoring the dose of corrosion inhibitor applied to the water in a corrosion control program. GRA

N83-29381# Bureau of Mines, Reno, Nev.
RECOVERY OF TUNGSTEN FROM A HYDROTHERMALLY ALTERED DEPOSIT. REPORT OF INVESTIGATIONS, 1982
A. E. Raddatz, J. M. Gomes, J. J. Sjoberg, and M. M. Wong Nov. 1982 19 p refs
(PB83-157719; BM-RI-8720; LC-82-600207) Avail: NTIS HC A02/MF A01 CSCL 11F

Methods for recovering tungsten from domestic resources are investigated. A calcine-quench-leach (CQL) technique was developed for the extraction of tungsten from hot springs ores. The deposit contains disseminated tungsten that cannot be beneficiated by conventional techniques and must be treated by hydrometallurgical methods. The CQL procedure consists of calcining the ore at 900 C for 3 hours, quenching in a solution containing 1.5 parts of Na2CO3 and 1.5 parts of NaOH per part of WO3 in the ore and at a solution-to-ore ratio of 3 to 1, leaching at 200 C and at 250 psig for 3 hours, and filtering and washing the residue. A series of closed circuit batch tests showed that 92 pct of the tungsten was extracted from a sample containing 2.32 wt-pct WO3. The pregnant solution contained 11 g/1 WO3. GRA

N83-29382# Bureau of Mines, Rolla, Mo.
IN-PLANT RECYCLING OF STAINLESS AND OTHER SPECIALTY STEELMAKING WASTES. REPORT ON INVESTIGATIONS, 1982
W. L. Higley, Jr., R. L. Crosby, and L. A. Neumeier Nov. 1982 21 p refs
(PB83-157701; BM-RI-8724; LC-82-600248) Avail: NTIS HC A02/MF A01 CSCL 11F

The Bureau of Mines has devised a process for recovering about 90 pct of the chromium and molybdenum and well over 90 pct of the nickel and iron from stainless steelmaking furnace dusts, swarf, and mill scale. Other metals such as manganese are also recovered. Initial laboratory results were confirmed and expanded to include a wide variation of stainless steelmaking waste mixtures. Later experiments have included specialty steelmaking wastes other than from stainless steelmaking. Significantly, the ease of technology transfer has been demonstrated by a number of industrialized (19-ton) commercial electric furnace heats, in which the pelletized wastes represented some 10 to 20 pct of the furnace charge, replacing part of the normal scrap charge. GRA

N83-29383# Bureau of Mines, Reno, Nev.
RECOVERY OF SULFUR AND ACCESSORY METALS FROM A LEACHING PROCESS RESIDUE Report of Investigations, 1982
K. P. V. Lei, T. G. Carnahan, and J. A. Eisele Nov. 1982 19 p refs
(PB83-157651; BM-RI-8733; LC-82-600266) Avail: NTIS HC A02/MF A01 CSCL 11F

The Bureau of Mines, as part of its research effort to minimize the generation of hydrometallurgical waste, investigated a sodium sulfide leaching electrolysis procedure for treating hydrometallurgical residues for elemental sulfur and base metals recovery. GRA

N83-29384# National Bureau of Standards, Washington, D.C. National Measurement Lab.
RECYCLING MUNICIPAL FERROUS SCRAP
James G. Early Sep. 1982 37 p refs
(PB83-156968; NBSIR-82-2571) Avail: NTIS HC A03/MF A01 CSCL 11F

Ferrous scrap recovered from municipal solid waste is one of the new sources of old scrap that may satisfy these increased demands. Systems for the recovery of the ferrous fraction from municipal solid waste were developed, although increased usage of municipal ferrous scrap was very slow due to institutional and technical barriers. The technical barriers posed by the physical and chemical characteristics of municipal ferrous scrap strongly inhibit the development of markets for this new material. The real and potential markets for increased consumption of municipal ferrous scrap are discussed in terms of these barriers together with the important role of standards for municipal ferrous scrap in improving communications between buyers and sellers. GRA

N83-29385# Bureau of Mines, Denver, Colo. Minerals Availability Field Office.
PLATINUM AVAILABILITY - MARKET ECONOMY COUNTRIES: A MINERALS AVAILABILITY SYSTEM APPRAISAL
T. F. Anstett, D. I. Bleiwas, and C. Sheng-Fogg Nov. 1982 23 p refs
(PB83-156869; BM-IC-8897; LC-82-600204) Avail: NTIS HC A02/MF A01 CSCL 11F

The Bureau of Mines investigated the availability of platinum from known major deposits in market economy countries. Fifteen of these deposits contain demonstrated resources totaling 302 million troy ounces of platinum. Detailed geologic, engineering, and cost evaluations were performed on each deposit to determine its potential for platinum production. There are large amounts of demonstrated platinum potentially available from market economy deposits that were not analyzed owing to lack of adequate data or to technological limitations. These include 297 million troy ounces contained in the UG2 and Platreef of the Bushveld Complex, South Africa. GRA

N83-29386# National Materials Advisory Board, Washington, D.C.
TITANIUM: PAST, PRESENT, AND FUTURE Final Report
Jan. 1983 218 p refs
(Contract EDW-C-0008)
(PB83-171132; NMAB-392) Avail: NTIS HC A10/MF A01 CSCL 11F

The capabilities of the United States to meet current and anticipated needs for titanium and its alloys are assessed. The various production steps from ore through mill products are examined both historically and for their adequacy to meet perceived future demands. Bottlenecks throughout this production cycle are identified and promising solutions to problems are put forward. Encouraging evidence of recent U.S. private enterprise entrepreneurial activities is noted. End uses of titanium mill products are reviewed historically as a basis to anticipate future developments and requirements. Technological opportunities and the role of innovation in the future of titanium are examined and several good prospects are perceived. The close relationship of U.S. government agencies with the U.S. titanium industry from its start three decades ago is reviewed. Recommendations are made that would permit the industry to serve the nation even better in the future. GRA

N83-29387# National Materials Advisory Board, Washington, D.C.
FERROUS METAL FIRES Final Report
1982 75 p refs
(Contract DOT-CG-948071-A)
(PB82-263161; NMAB-393) Avail: NTIS HC A04/MF A01 CSCL 11F

Because serious fires with bulk cargoes of ferrous metal turnings and with direct reduced iron (DRI) occur during marine transport, the U.S. Coast Guard needs improved inspection and testing procedures for acceptance of these materials prior to shipment. Background information is presented on the types of ferrous materials of concern, their chemical and physical characteristics, present practices for handling and loading cargoes, and some case histories of fire incidents aboard ship. A conceptual model of spontaneous overheating is developed to give some insight into the mechanisms of reoxidation and heat dissipation, the understanding of which is necessary to develop conclusions and recommendations for mitigating the problem of ferrous metal

fires. Test methods for determining the susceptibility of cargo to overheating are discussed as well as countermeasures aimed at preventing or monitoring self-heating cargoes. Methods for intervening in the case of excessive heating of a cargo in a hold are also reviewed. GRA

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N83-29388* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
METHOD OF FORMING OXIDE COATINGS Patent
Glen E. McDonald, inventor (to NASA) Issued 12 Jul. 1983 3 p Filed 10 Jun. 1981 Supersedes N81-27616 (19 - 18, p 2509)
(NASA-Case-LEW-13132-1; US-Patent-4,392,920; US-Patent-Appl-SN-272152; US-Patent-Class-204-37R; US-Patent-Class-204-35N; US-Patent-Class-204-56R) Avail: US Patent and Trademark Office CSCL 11D

This invention is concerned with an improved plating process for covering a substrate with a black metal oxide film. The invention is particularly directed to making a heating panel for a solar collector. A compound is electrodeposited from an aqueous solution containing cobalt metal salts onto a metal substrate. This compound is converted during plating into a black, highly absorbing oxide coating which contains hydrated oxides. This is achieved by the inclusion of an oxidizing agent in the plating bath. The inclusion of an oxidizing agent in the plating bath is contrary to standard electroplating practice. The hydrated oxides are converted to oxides by treatment in a hot bath, such as boiling water. An oxidizing agent may be added to the hot liquid treating bath.
Official Gazette of the U.S. Patent and Trademark Office

N83-29389 Prins Maurits Lab. TNO, Rijswijk (Netherlands).
POROUS POLYMERS AS ADSORBENT FOR MUSTARD GAS [POREUZE POLYMEREN ALS SORBENT VOOR MOSTERDGAS]
L. J. M. Luijen and P. P. M. M. Wittgen Dec. 1981 38 p refs In DUTCH; ENGLISH summary
(Contract A77/KL/062)
(PML-1981-46; TDCK-76162) Copyright. Avail: Issuing Activity

Porous polymers were investigated as a remplacement for active carbon as adsorbent for harmful compounds from the air. The preparation of different polymers based on crosslinked polystyrene-divinylbenzene is described. The best porous adsorbent for mustard is a polymer with a high degree of crosslinking (78%) resulting in a surface area of 700 sqm/g. The sorption capacity for mustard vapor is 2 to 3 times the capacity of active carbon. Because of the pore size distribution and the nature of the surface, water vapor adsorption is very low. Introducing functional groups does not significantly change the adsorptive behavior and the capacity of the polymer towards mustard vapor. The kinetics of the adsorption is poor compared with active carbon. Porous polymer impregnated foams give less protection at low relative humidity than carbon impregnated foams. Comparable commercial porous polymers are available but are expensive.
Author (ESA)

N83-29390*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ELASTOMER TOUGHENED POLYIMIDE ADHESIVES Patent Application
Anne K. St.Clair and Terry L. St.Clair, inventors (to NASA) Filed 28 Jan. 1983 14 p
(NASA-LAR-12775-2; US-Patent-Appl-SN-461788) Avail: NTIS HC A02/MF A01 CSCL 11A

A rubber toughened addition type polyimide composition having excellent high temperature bonding characteristics in the fully cured state and improved peel strength and adhesive fracture resistance physical property characteristics is disclosed. The process for making the improved adhesive involves preparing the rubber containing amic acid prepolymer by chemically reacting an amine terminated elastomer and an aromatic diamine with an aromatic dianhydride with which a reactive chain stopper anhydride was mixed, and utilizing solvent or mixture of solvents for the reaction.
NASA

N83-29391*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A SOLVENT RESISTANT, THERMOPLASTIC AROMATIC POLY (IMIDESULFONE) AND PROCESS FOR PREPARING SAME Patent Application
David A. Yamaki and Terry L. St.Clair, inventors (to NASA) Filed 6 May 1983 12 p
(NASA-Case-LAR-12858-2; US-Patent-Appl-SN-492282) Avail: NTIS HC A02/MF A01 CSCL 11I

A process for preparing a thermoplastic poly(imidesulfone) is disclosed. This resulting material has thermoplastic properties which are generally associated with polysulfones but not polyimides, and solvent resistance which is generally associated with polyimides but not polysulfones. This system is processable in the 250 to 350 C range for molding, adhesive and laminating applications. This unique thermoplastic poly(imidesulfone) is obtained by incorporating an aromatic sulfone moiety into the backbone of an aromatic linear polyimide by dissolving a quantity of a 3,3 prime, 4,4 prime-benzophenone tetracarboxylic dianhydride (BTDA) in a solution of 3,3 prime-diamino diphenylsulfone and bis(2-methoxyethyl)ether, precipitating the reactant product in water, filtering and drying the recovered poly(amide-acid sulfone) and converting it to the poly(imidesulfone) by heating. NASA

N83-29392*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
LOW TEMPERATURE CROSS LINKING POLYIMIDES Patent Application
Tito T. Serafini and Peter Delvigs, inventors (to NASA) Filed 30 Jun. 1982 14 p
(NASA-Case-LEW-12876-2; US-Patent-Appl-SN-393583) Avail: NTIS HC A02/MF A01 CSCL 11I

A polyimide is formed by cross linking a prepolymer formed by reacting a polyfunctional ester, a polyfunctional amine, and an end-capping unit. By providing an end-capping unit, the prepolymer is curable at a relatively low temperature of about 175 to 245 C.
NASA

N83-29393*# IIT Research Inst., Chicago, Ill.
CREEP OF PLASMA SPRAYED ZIRCONIA Final Report
R. F. Firestone, W. R. Logan, and J. W. Adams Nov. 1982 61 p refs
(Contracts NAS3-20828; NAS3-22127)
(NASA-CR-167868; NAS 1.26:167868; IITRI-M06071-20) Avail: NTIS HC A04/MF A01 CSCL 11B

Specimens of plasma-sprayed zirconia thermal barrier coatings with three different porosities and different initial particle sizes were deformed in compression at initial loads of 1000, 2000, and 3500 psi and temperatures of 1100 C, 1250 C, and 1400 C. The coatings were stabilized with lime, magnesia, and two different concentrations of yttria. Creep began as soon as the load was applied and continued at a constantly decreasing rate until the load was removed. Temperature and stabilization had a pronounced effect on creep rate. The creep rate for 20% Y2O3-80% ZrO2 was 1/3 to 1/2 that of 8% Y2O3-92% ZrO2. Both magnesia and calcia stabilized ZrO2 crept at a rate 5 to 10 times that of the 20% Y2O3 material. A near proportionality between creep rate and applied stress was observed. The rate controlling process appeared to be thermally activated, with an activation energy of approximately 100 cal/gm mole K. Creep deformation was due to cracking and particle sliding. Author

N83-29394# College of Aeronautics, Cranfield (England).
SPRAY IMPACTION, RETENTION AND ADHESION: AN INTRODUCTION TO BASIS CHARACTERISTICS

J. J. Spillman Nov. 1982 26 p refs
(CA-8215; ISBN-0-902937-76-6) Avail: NTIS HC A03/MF A01

Droplet movement toward a specific target is affected by several factors. Factors discussed are: surface effects, wind effects, movement relative to the surrounding air, charge of the particle, electromagnetic fields, stopping distances and impact dynamics.
B.G.

N83-29395# Aerospace Corp., El Segundo, Calif. Materials Sciences Lab.

NONEQUILIBRIUM DISCLINATIONS IN THE CARBONACEOUS MESOPHASE

M. Buechler, C. B. Ng, and J. I. White 21 Jan. 1983 14 p refs
(Contract F04701-82-C-0083)
(AD-A125807; SD-TR-83-06; TR-0083(3935-02)-1) Avail: NTIS HC A02/MF A01 CSCL 11/2

The behavior of carbonaceous mesophase in the liquid crystalline state has been observed directly by polarized light on the free surface of a petroleum pitch during pyrolysis. The present work focuses attention on the reactions between various disclinations, and primarily on the spontaneous generation of new disclinations from compressed folds in the mesophase layers. Specimens quenched from critical stages in such reactions reveal that structures of freshly formed disclinations can be distorted appreciably from the equilibrium structures of relaxed disclinations.
Author (GRA)

N83-29396# Cincinnati Univ., Ohio. Dept. of Materials Science and Metallurgical Engineering.

PHASE EQUILIBRIA AND TRANSITION IN MIXTURES OF A HOMOPOLYMER AND A BLOCK COPOLYMER. 1: SMALL-ANGLE X-RAY SCATTERING STUDY

W. C. Zin and R. J. Roe 8 Mar. 1983 39 p refs
(Contract N00014-77-C-0376)
(AD-A125818; TR-8) Avail: NTIS HC A03/MF A01 CSCL 11/9

The small-angle X-ray scattering technique is utilized to study the phase separation and phase transition occurring in the mixtures of a styrene butadiene diblock copolymer with a low molecular weight polystyrene. At low temperatures the scattering curve shows a main peak and a secondary peak indicating the presence of well-developed microdomains. As the temperature is raised the peaks gradually lose intensity. The binodal and spinodal temperatures for the transition between the ordered structure at low temperature and the disordered, homogeneous structure at high temperature are determined and found to increase with increasing amount of the added polystyrene. With increasing amount of polystyrene the main peak at first shifts toward lower angles, indicating an increased distance between microdomains. However, at concentrations beyond about 50% polystyrene, which evidently corresponds to the solubility limit of the latter in the microdomains, the peak position remains constant. The observed shift in the relative position of the secondary peak suggests that the morphology of the microdomains changes gradually from spherical to lamellar as the proportion of polystyrene is increased. With all the mixtures no evidence is found for an increase in the microdomain boundary thickness with increasing temperature.
GRA

N83-29397# Colorado State Univ., Fort Collins. Dept. of Chemistry.

CROSS-LINKING REACTIONS OF THERMALLY STABLE HIGH PERFORMANCE POLYMERS Final Report, Jan. 1980 - Dec. 1982

J. K. Stille Feb. 1983 53 p refs
(Contract DAAG29-80-C-0045)
(AD-A125967; ARO-16746.7-CH) Avail: NTIS HC A04/MF A01 CSCL 11/9

The relationships between the structures and the morphology, solution properties and mechanical properties of polyquinolines depend upon the manner in which the quinoline units are linked together. A wide variety of structures account for polyquinolines that either are amorphous, soluble in common organic solvents and have moderately high glass transition temperatures (approx. 250C) or are crystalline, are soluble only in acidic solvents, forming anisotropic solutions, and have high crystalline transition temperatures (greater than 500 C). The conducting properties of certain doped polyquinolines containing either total conjugation or sulfur linkages between quinoline units are described. Graphite reinforced composites were prepared from biphenylene end-capped polyquinoline and polyimide pre-polymers. The composites demonstrated excellent initial properties and low weight loss after oxidative aging at 316 C. However, the mechanical properties were severely diminished after aging for 50-100 h at 316 C in air and photomicrographs of the composites after aging showed the presence of voids.
GRA

N83-29398# Utah Univ., Salt Lake City. Dept. of Materials Science and Engineering.

SILICON CARBIDE ALLOYS Final Report, 15 Dec. 1978 - 14 Sep. 1982

Anil V. Virkar, M. R. Plichta, and W. Rafaniello 28 Feb. 1983 6 p ref
(Contract DAAG29-81-C-0004; Grant DAAG29-79-G-0042)
(AD-A125968; ARO-16062.3-MS) Avail: NTIS HC A02/MF A01 CSCL 11/2

SIC-AIN ceramics are fabricated by hot pressing a powder derived from carbothermal reduction of silica and alumina in nitrogen atm. Densities were greater than 99% theoretical. At high temp. a complete solid solution exists but at a low temp. (below approx. 1800 C) phase separation occurs by (1) nucleation and growth, (2) cellular, and (3) spinodal mechanism. This indicates that a miscibility gap exists. Thermal conductivity, expansion coefficient, strength, fracture toughness and Youngs modulus were determined. Extensive electron microscopy was conducted.
GRA

N83-29399# Michigan Univ., Ann Arbor. Dept. of Materials and Metallurgical Engineering.

PROCESS DEVELOPMENT FOR SILICON CARBIDE BASED STRUCTURAL CERAMICS Interim Report, 1 Sep. 1981 - 31 May 1982

Edward E. Hucke Jan. 1983 53 p refs
(Contract DAAG46-80-C-0056)
(AD-A125857; AMMRC-TR-83-5) Avail: NTIS HC A04/MF A01 CSCL 11/2

The objective of this program is to develop a process for making shaped silicon carbide based ceramic materials with reduced microstructural flaw size by in situ reaction of silicon with fine, ultra-uniform pored carbon skeletons that are produced from liquid polymer solutions without particulate additions. A very uniform siliconized microstructure has been made from a carbon skeleton with average pore size of approx. 1.9 micrometers and apparent density of approx. 85 gm/cc. This material had a room temperature, four point Weibull characteristic strength of 714 MPa which exceeds commercial reaction bonded SiC (NC433) by approx 100, sintered alpha -SiC by approx 85, and approximately equals hot pressed SiC (NC203) when tested under identical conditions. The fracture toughness, KIC, measured by Vickers indentation testing was approximately the same as hot pressed Silicon carbide (NC203). Efforts to produce finer structured materials have not yet reproducibly achieved uniform microstructures free from silicon viening. The materials thus far produced give Weibull moduli in the range 5 to 7 compared with 10-15 for the commercial materials. Fracture analysis indicates the lower values are due to machining defects and undesirable microstructures at the surfaces which were incompletely removed in sample preparation.
GRA

N83-29400# Naval Research Lab., Washington, D. C. Surface Chemistry Branch.

ELECTROACTIVE POLYMERS AS ANTISTATIC MATERIALS Interim Report

M. K. Bernett, H. Ravner, and D. C. Weber 7 Feb. 1983 22 p refs
(AD-A126102; AD-E000532; NRL-MR-5016) Avail: NTIS HC A02/MF A01 CSCL 13/4

Current materials used for packaging precision instrument bearings contain minor amounts of antistatic agents, shown earlier to be potential contaminants to both bearing surfaces and

lubricants. This investigation reports on conductive electroactive polymers as a novel approach to eliminate completely the need for antistatic additives. Polyacetylene, specially prepared at this laboratory, polyparaphenylene sulfide and a copolymer were modified by chemical doping or implantation with appropriate ions to optimize surface conductivity and oxidation stability. Effects of extended contact with lubricated and unlubricated bearing steel surfaces were examined. Newly available antistatic or conductive materials were also investigated. GRA

N83-29401# Alabama Univ., Birmingham.
RESPONSE OF COMBINED ELECTRICAL STIMULATION AND BIODEGRADABLE CERAMICS Final Report
Jack E. Lemons Jun. 1982 19 p refs
(Contract DAMD17-75-C-5044; DA Proj. 3S1-62775-A-825)
(AD-A126300; REPT-7) Avail: NTIS HC A02/MF A01 CSCL 11/2

Investigations were conducted on porous tricalcium phosphate ceramic proposed for bone replacement. Rod and granular forms were studied using the ceramic alone and in combination with autogeneous bone. Animal models included mid-shaft replacements of rabbit tibiae and dog radii. The bone lesions included the initial placement of ceramic at the first surgical procedure and at nonunion sites. In general, the biomaterial analyses showed reproducible materials with porosity that permitted bone ingrowth; minimal difficulties in handling the material; bone ingrowth into the rod forms with biomechanical strengths similar to controls; variability in the rate of resorption for the rod form ceramic; minimal influence of electrical stimulation on the rate of ceramic resorption and bone ingrowth; a low probability for the correction of nonunions with the rod or granular form ceramic when used alone; a high probability of nonunion corrections when the ceramic was used with autogeneous bone; a dependence upon the relative ratio and quantity of granular form ceramic and autogeneous bone mixtures; no significant differences between -40 +100 mesh or 1, 2 or 3 mm size granular materials; residual ceramic retained in dog radii implant sites at 4 years; and very acceptable tissue responses to the TCP material throughout this 1975 to 1981 study.
Author (GRA)

N83-29402# Foxboro Co., Burlington, Mass.
WEAR PARTICLE ATLAS, REVISED Final Technical Report
Daniel P. Anderson 28 Jun. 1982 199 p refs
(Contract N68335-80-C-0529; WF41460000)
(AD-A125512; NAEC-92-163) Avail: NTIS HC A09/MF A01 CSCL 11/8

The Wear Particles Atlas (revised) is a guide to wear particle identification containing photographs of typical wear particles found in used lubricating oil, illustrative case histories, and operational procedures for wear debris analysis. Wear particle analysis supports identification of wear modes within a machine based on the quantity, morphology, and composition of particles present in a representative lubricant sample. Photomicrographs in this document facilitate technology transfer to the neophyte and act as a guide to the experienced analyst. Section 1.0 on Wear Particle Identification describes particle morphologies, distinguishes between ferrous and nonferrous materials, and illustrates typical particulate contamination. Section 2.0 Case Histories, shows the potential utility of wear debris analysis and the progression of thought that goes into an analysis. Section 3.0 Operational Procedures, details the methodologies used in wear debris analysis. Author (GRA)

N83-29403# Massachusetts Inst. of Tech., Cambridge. Dept. of Chemistry.
ORGANOSILICON COMPOUNDS AND ORGANOSILICON POLYMER INTERMEDIATES Final Report, 1 Oct. 1978 - 30 Sep. 1982
Dietmar Seyferth 21 Mar. 1983 12 p refs
(Grant AF-AFOSR-0007-79; AF Proj. 2303)
(AD-A127752; AFOSR-83-0366TR) Avail: NTIS HC A02/MF A01 CSCL 07/3

Studies of the highly reactive Si-C bonds of hexamethylsilacyclopropane and of 1,1-dimethy1-3,4-bis(trimethylsilyl)-silacyclopropene and of the reactive Si-Si bond of octamethyl1-1,2-disilacyclobutane completed. RP- and RAs-bridged ferrocenophanes were prepared and their reactions with organolithium reagents studied. Ferrocenylenephenylphosphine polymers were prepared for use as ligands in catalysis studies. Their cobalt complexes are active hydroformylation catalysts. A novel and useful route to acylsilanes based on the carbon monoxide-derived acyllithium reagents has been developed. The hydrolysis of dichlorosilane, was found to give cyclic oligomers, with n equals 4 through 23, in decreasing amounts. Linear species also were prepared and studied. A study of the transition metal chemistry of cyclodiisopropylsilane was initiated with the ultimate objective of preparing transition metal silicides. A study of the reactivity of calcium disilicide derived 'reactive silicon' and 'silicon mono halides' was started. Author (GRA)

N83-29404# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
MECHANICAL RELIABILITY OF CURRENT ALUMINA AND BERYLLIA CERAMICS USED IN MICROWAVE WINDOWS FOR GYROTRONS
P. F. Becher and M. K. Ferber Feb. 1983 17 p refs
(Contract W-7405-eng-26)
(DE83-006360; ORNL/TM-8555) Avail: NTIS HC A02/MF A01

The mechanical reliability was evaluated for the alumina and beryllia ceramics now used as microwave windows in the high power (greater than or equal to 200 kW) high frequency (greater than or equal to 60 GHz) gyrotron tubes developed for plasma heating in fusion systems. Analysis of the stresses generated in the various window configurations and tube operating conditions indicated that significant tensile stresses are generated in the ceramic window by dielectric heating. As a result, the static and dynamic fatigue behavior and the inert strength distributions for these two ceramics (i.e., fatigue studies included the behavior in the fluorocarbon fluid used for window cooling at 22 and 48 C and in both air (65% relative humidity) and distilled water at 22 C were characterized. These data were then analyzed in order to construct reliability diagrams for these materials. DOE

N83-29405# California Univ., Berkeley. Lawrence Berkeley Lab. Div. of Biology and Medicine.
CIRCULAR DIFFERENTIAL SCATTERING IS AN IMPORTANT PART OF THE CIRCULAR DICHROISM OF MACROMOLECULES
Carlos Bustamante, Ignacio Tinoco, Jr., and Marcos F. Maestre Nov. 1982 30 p refs
(Contract DE-AC03-76SF-00098; Grants NIH-GM-10840; NIH-AI-08247)
(DE83-007022; LBL-15368) Avail: NTIS HC A03/MF A01

Differential scattering of incident left and right circularly polarized light is an important contribution to the circular dichroism of macromolecules. In principle both differential absorption and differential scattering of circularly polarized light contribute to circular dichroism, but differential scattering is increasingly important for particles whose dimensions are greater than one twentieth the wavelength of light. Outside the absorption bands of the particle, only differential scattering contributes to the circular dichroism. The sign and magnitude of the differential scattering is quantitatively related to the relative orientations and the distances between the scattering units of the particle. The interpretation of the circular differential scattering depends on a simple, classical method. Thus, in understanding a measured circular dichroism, it will often be easier to relate the differential scattering to the structure of a particle (such as a virus) than it is to relate the differential absorption to the structure. DOE

N83-29406# California Univ., Livermore. Lawrence Livermore Lab.
SYNTHESIS AND CHARACTERIZATION OF A NEW SILICONE MULTIBLOCK POLYMER
Michael O. Riley, John R. Kolb, and Edward S. Jessop 10 May 1982 23 p refs Presented at JOWOG-28, Kansas City, Mo., 10-11 Jun. 1982

(Contract W-7405-eng-48)
(DE82-015189; UCRL-87613; CONF-820642-2) Avail: NTIS HC A02/MF A01

The Lawrence Livermore National Laboratory (LLNL) has an active interest in the synthesis of new polysiloxanes as base polymers for cellular silicone materials. These elastomers have properties uniquely suited to very specific engineering requirements. While the polymers which were prepared via random equilibrium of various cyclic tetrasiloxanes have adequate properties for certain applications, there is evidence to suggest that alternating block polysiloxanes prepared via condensation polymerization techniques have properties more suited to end uses as flexible foam materials (cushions). The synthetic sequence developed to prepare these materials involves reactions of functionally terminated (silylamino and silanol) polysloxane oligomers to produce alternating multiblock (ABAB...) materials of high molecular weight. Dialkylamines are condensation byproducts in this reaction. The analysis and characterization of these multiblock polymers is reported. DOE

N83-29407# Volkswagen A.G., Wolfsburg (West Germany). Forschung Antriebstechnik.
DEVELOPMENT OF CERAMIC AUTOMOBILE TURBINE ENGINE COMPONENTS Final Report, Apr. 1981
Manfred Langer and Johann Siebels Bonn Bundesministerium fuer Forschung und Technologie Mar. 1983 126 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-025; ISSN-0340-7608) Avail: NTIS HC A07/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 26,50

The development of ceramic components for an experimental gas turbine of 100 kW output is discussed. Satisfactory application of statically loaded ceramic parts, e.g., hot testing of a turbine stator ring, is described. Monolithic axial turbine rotors made from reaction bonded silicon nitride (RBSN) were cold tested successfully up to circumferential speeds in excess of 400 m/sec. Results for monolithic sintered silicon carbide radial turbine rotors under normal operating conditions are good. Individual RBSN turbine blades mounted in metal disks satisfy qualification tests.
Author (ESA)

N83-29408# Rosenthal-Stemag, Technische Keramik A.G., Selb (West Germany).
DEVELOPMENT OF HIGH-TEMPERATURE RESISTANT, NON-CORROSIBLE, NONMETALLIC CERAMIC MATERIALS, ESPECIALLY SILICON NITRIDE, FOR HEAT EXCHANGERS IN GAS TURBINE APPLICATION Final Report, Feb. 1980
Stefan Schindler and Axel Krauth Bonn Bundesministerium fuer Forschung und Technologie Mar. 1983 106 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-026; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 22

The improvement of silicon nitride concerning oxidation resistance and strength, suitable production techniques such as foil casting, injection molding, extrusion and isostatic pressing, as well as the manufacturing of structural components with improved material data (heat exchanger, single stator blades and 4-blade-segments) for test purposes are examined. A close relationship between production techniques, construction and testing in simulated application conditions is found. In spite of the change of production technique - from extrusion to foil casting - the progress in heat exchanger development is promising.
Author (ESA)

N83-29409# Council for Scientific and Industrial Research, Pretoria (South Africa). Technical Services Dept.
PLASTICS IN THE 80's
Mar. 1982 82 p
(PB83-163311; TSD-BOOK-0001/82; ISBN-0-7988-2357-7) Avail: NTIS HC A05/MF A01 CSCL 11I

Several areas of plastics were addressed including: high-duty, fiber-reinforced plastics; plastics in the automotive industry; electron beam processing of plastics; the future of plastics in the construction industry; the use of plastics for domestic products; and designing in plastics, with particular reference to the role of the mold designer. GRA

N83-29410# Bureau of Mines, University, Ala.
INFLUENCE OF SELECTED ADDITIVES AND CaO:SiO2 RATIO ON HIGH-TEMPERATURE STRENGTH OF MgO REFRACTORIES Report of Investigations, 1982
Nancy S. Raymon Nov. 1982 13 p ref
(PB83-157875; BM-RI-8732; LC-82-600284) Avail: NTIS HC A02/MF A01 CSCL 11B

The effect of controlled additions of selected metal oxides, as well as the adjustment of the calcia-to-silica ratio on the high temperature strength of refractory grade periclase is investigated. Increases in the hot flexural strength of some periclase materials in the range of threefold to fourfold were obtained with additions of ZrO2 and by adjustment of the CaO:SiO2 ratio to the 2.5 to 3.0 level. Results show that for each periclase refractory raw material, there exists a combination of level of ZrO2 addition and an adjustment to the CaO:SiO2 ratio that optimizes the hot flexural strength of each of these materials. Data also indicate that the improved hot strengths can be attributed to the high temperature secondary phases formed between the different levels of periclase impurities and the additives, resulting in improved intergranular high temperature bond strength. GRA

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N83-29411 Cranfield Inst. of Tech., Bedfordshire (England). Management Library.
ALTERNATIVE FUEL TECHNOLOGY SERIES. VOLUME 2: COMPARATIVE PROPERTIES OF CONVENTIONAL AND ALTERNATIVE FUELS
E. M. Goodger [1982] 56 p refs 2 Vol.
(ISBN-0-902937-66-9) Copyright. Avail: Issuing Activity

A consistent set of commonly used physical, chemical, and thermochemical property data relating to a wide range of gaseous, liquid and solid fuels, both conventional and alternative are presented on a comparative basis by using a single table for each major group of related properties. The data are intended as values acceptable primarily for teaching and design purposes but they could be used in many cases for initial calculations in research. When conventional fuels are supplemented by materials from other sources (e.g., gasoline from methanol, and natural gas type mixture from coal), it can be assumed for a first approximation that the properties of these alternative fuels are broadly similar to those of the conventional fuels they supplement. S.L.

N83-29412# Committee on Energy and Commerce (U. S. House).
METHANOL AS AN ALTERNATE TRANSPORTATION FUEL
Washington GPO 1983 302 p refs Hearings before the Subcomm. on Fossil and Syn. Fuels of the Comm. on Energy and Com., 97th Congr., 2d Sess., 13 Aug. and 24 Sep. 1982
(GPO-12-626) Avail: Subcommittee on Fossil and Synthetic Fuels

Developments in the methanol industry are examined to identify barriers to market penetration and to assess policy options available to the Federal Government to promote the commercialization of methanol. Environmental concerns and problems of the petroleum and automobile industries are also discussed. A.R.H.

N83-29413# Committee on Energy and Commerce (U. S. House).
US SYNTHETIC FUELS CORPORATION AND NATIONAL SYN-

FUELS POLICY
Washington GPO 1982 72 p Rept. presented by the Subcomm. on Fossil and Syn. Fuels of the Comm. on Energy and Com., 97th Congr., 2d Session, Jul. 1982 Proc. of a seminar held in Washington, D.C., 3 Feb. 1982
(GPO-96-481) Avail: US Capitol, House Document Room

The current status and policies of the United States Synthetic Fuels Corporation (SFC) were discussed. Also included were discussions on the current challenges facing the U.S. synfuels industry, environmental and industrial concerns regarding the emerging synfuels industry and the National Synfuels Policy. B.G.

N83-29414# Cranfield Inst. of Tech., Bedfordshire (England). Management Library.
ALTERNATIVE FUEL TECHNOLOGY SERIES. VOLUME 1: ALTERNATIVE FUELS FOR TRANSPORT
E. M. Goodger [1982] 38 p ref
(ISBN-0-902937-63-4) Avail: NTIS HC A03/MF A01

The fuels that are proposed as candidates for conventional fuel extenders or substitutes in the three main branches of transport surface, marine and air are reviewed. Summaries of short courses that were held on this subject together with lists of references to student research theses and dissertations, and related publications are presented. S.L.

N83-29415# Army Armament Research and Development Command, Dover, N. J. Large Caliber Weapon Systems Lab.
SENSITIVITY CHARACTERIZATION OF LOW VULNERABILITY (LOVA) PROPELLANTS
M. S. Kirsenbaum, L. Avrami, and B. Strauss Mar. 1983 49 p refs
(AD-A126130; AD-E400978; ARLCD-TR-83005) Avail: NTIS HC A03/MF A01 CSCL 19/1

Low vulnerability (LOVA) propellants are being developed to improve the combat survivability and effectiveness of our current weapon systems. The basic LOVA formulation contains approximately 75% nitramine filler. This report describes the results of a study that was conducted to determine the sensitivity properties of a number of the candidate LOVA propellants as well as seven conventional nitrate ester propellants (M30, M26, M6+2, NACO, two United Kingdom propellants, F527/428, and NQ, and one propellant from the Federal Republic of Germany, JA-2). The laboratory sensitivity and thermal stability tests included impact sensitivity, DTA, TGA, autoignition temperature, explosion temperature, VTS, HFCI, and DDT. The data generated is being used for comparative purposes with the conventional reference propellants, and to develop criteria for evaluation in final selection of a LOVA candidate for scale up to a production improvement program.GRA

N83-29416# Army Mobility Equipment Research and Development Center, Fort Belvoir, Va. Rubber and Coated Fabrics Research Group.
MATERIALS COMPATIBILITY STUDIES WITH FUEL/ALCOHOL MIXTURES Technical Progress Report, May 1979 - Nov. 1981
Paul Touchet, Basil Zanedis, Mari-Catherine Fischer, and Paul E. Gatza Jul. 1982 142 p
(AD-A126076; MERADCOM-2366) Avail: NTIS HC A07/MF A01 CSCL 21/4

Representative fuel-resistant elastomers, plastics, and metals were evaluated for compatibility with commercial gasolines, diesel fuel, ASTM test fuels, and blends thereof with ethanol and methanol at several concentration levels. The test program was designed to ascertain the effects of the fuels on the materials as well as the effects, if any, of the materials on the fuels. Results were analyzed and interpreted of significant changes in the performance characteristics of the materials and the fuels which would be indicative of potential incompatibilities for use in end items of military equipment. Author (GRA)

N83-29417# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE DURATION PERIOD OF PROPELLANTS FOR CLASSICAL AND ROCKET ARMAMENT
M. Colakovic 28 Jan. 1983 19 p refs Transl. into ENGLISH from Naucho-Tehnicki Pregled (Yugoslavia), v. 29, no. 2, 1979 p 18-25
(AD-A126219; FTD-ID(RS)T-1274-82) Avail: NTIS HC A02/MF A01 CSCL 21/9

A review is given of the achievements in the realm of forecasting the secure storage and use of solid propellants. Specific attention is given to rocket propellant, as the most critical element of the system. Its specific composition, form, and grain size represent a suitable base or the development of a series of defects with catastrophic results during use. Author

N83-29418# Transco Products, Inc., Arcadia, Calif.
TRANSCO MEDIUM-Btu COAL GASIFICATION PROJECT. EXECUTIVE SUMMARY Final Report
Mar. 1982 20 p refs
(Contract DE-FG01-81RA-50381)
(DE82-009598; DOE/RA-50381/1156-Exec-Summ) Avail: NTIS HC A02/MF A01

The feasibility study preliminary design demonstrates the ability to design a gasification facility capable of producing 125 MMMBtu/day of medium Btu gas in central Texas adjacent to a lignite resource. The lignite resurce selected is acceptable for the proposal with regard to geology, mine plan and lignite quality. The economic and financial analyses identified three key aspects of the project: the basic assumptions presented in the financial analysis are realized, product gas can be delivered at a minimum real price which is higher than current regulated prices for natural gas the most logical alternatives for the proposed customer; in order to raise the amount of debt required to finance the project, either a substantial consortium of partners or some type of loan guarantee, such as from the Synthetic Fuels Corporation, would be required. Improvements in several key variables could enhance the project economics significantly. DOE

N83-29419# Moleculon Research Corp., Cambridge, Mass.
LOW-ENERGY PROCESS TO EXTRACT ANHYDROUS ETHANOL FROM FERMENTATION BEERS
Larry D. Nichols, Marie B. Allen, and Chester Cekala Nov. 1982 54 p refs
(Contract DE-FG07-81ID-12324)
(DE83-005012; DOE/ID-12324/T1) Avail: NTIS HC A04/MF A01

The feasibility of an energy efficient technique was demonstrated utilizing patented POROPLASTIC ultramicroporous membranes for the separation of ethanol from fermentation beers. Initial research focused on the selection of the best solvent for extracting ethanol from aqueous ethanol feed streams. The most promising solvents were selected on the basis of physical properties, distribution coefficients, water rejection capabilities and cost. Several of the best strip solvents were then employed in actual membrane extractions. A single membrane extraction module was constructed, in which a strip solvent stream and an aqueous ethanol stream encountered a Poroplastic membrane. The membrane established the interface where ethanol transfer occurred. Membrane extraction systems with good ethanol extraction characteristics were successfully designed. A 33% ethanol solution was reduced to 26% in a long term extraction experiment with a net transport rate of 476 (SIGMA)g/cm(2)/min. Even though the rates of ethanol recovery appeared very promising the rates of water transfer were also significant. DOE

N83-29420# Institute of Gas Technology, Chicago, Ill.
HYDROPYROLYSIS OF BIOMASS TO PRODUCE LIQUID HYDROCARBON FUELS Final Report
Robert K. Fujita (Pacific Resources, Inc.), William W. Bodle, and Paul C. Yuen (Hawaii Univ.) Oct. 1982 315 p refs
(Grant DE-FG07-80RA-50324)
(DE83-009985; DOE/RA-50324/T1) Avail: NTIS HC A14/MF A01

A process design and cost estimates for a biomass hydropyrolysis plant is provided, and its economic viability for commercial applications is established. A plant site, size, product slate, and

the most probable feedstock or combination of feedstocks were determined. A base case design was made by adapting the HYFLEX process to Hawaiian biomass feedstocks. The HYFLEX process was developed to produce liquid and/or gaseous fuels from carbonaceous materials. The essence of the process is the simultaneous extraction of valuable oil and gaseous products from cellulosic biomass feedstocks without forming a heavy hard to handle tar. By controlling reaction time and temperature, the product slate can be varied according to feedstock and market demand. An optimum design and a final assessment of the applicability of the HYFLEX process to the conversion of Hawaiian biomass was made. In order to determine what feedstocks could be available in Hawaii to meet the demands of the proposed hydropyrolysis plant, various biomass sources were studied. These included sugarcane and pineapple wastes, indigenous and cultivated trees and indigenous and cultivated shrubs and grasses. DOE

N83-29421# California Univ., Davis. Dept. of Chemical Engineering.
CONTINUOUS PRODUCTION OF ETHANOL AND CHEMICAL BYPRODUCTS Final Report
David F. Ollis Oct. 1982 36 p refs
(Grant DE-FG07-81ID-12346)
(DE83-009667; DOE/ID-12346/T1) Avail: NTIS HC A03/MF A01

The chemostat design equations were derived and reported. A continuous culture apparatus was designed, ordered, and constructed. A completed lab scale continuous culture apparatus was realized by mid-spring of 1982. Continuous culture runs were made over various periods of time, mid-spring through mid-summer. These runs provide the experimental data listed as objective (operation of continuous culture for multiproduct spectrum including alcohol). Finally, from these results and the prediction of the model developed under objective, the applicability of the model to the experimental system that was used was determined. DOE

N83-29422# Lowell Univ., Mass.
DEVELOPMENT OF A PROCESS TO PRODUCE ALCOHOL AT PAPER MILLS Final Report
John W. Walkinshaw, Karl J. Sladek, David T. Eberiel, and Shan S. Wong Mar. 1983 84 p refs
(Grant DE-FG07-81ID-12322)
(DE83-009668; DOE/ID-12322/T1) Avail: NTIS HC A05/MF A01

An enzymatic process for converting waste cellulose to ethanol at paper mills was developed. Enzymes obtained from Novo Laboratories Inc. were used to degrade cellulose and a temperature tolerant strain of Saccharomyces uvarum was developed for fermentation. Vacuum distillation was used to recover ethanol and enzyme activity was retained after distillation, indicating that enzyme can be recycled. Runs continued as long as 55 days with no apparent buildup of toxic materials. Waste computer paper was used as a relatively clean simple feedstock, but high wet strengthed paper could be converted also. Ethanol yields as high as 83% of theoretical, based on cellulose fed, were achieved. DOE

N83-29423# Merix Corp., Babson Park, Mass.
ALCOHOL-FUELS GRANT PROGRAM. LOW-ENERGY ROUTE FOR ALCOHOL/GASOHOL RECOVERY FROM FERMENTOR BEER Final Report
Thomas W. Mix 1 Jan. 1983 40 p refs
(Contract FG07-81ID-12321)
(DE83-009665; DOE/ID-12321/T1) Avail: NTIS HC A03/MF A01

The production of gasohol directly from fermentor beer and gasoline is feasible and will enable a major reduction in the energy requirements for gasohol production. The fermentor beer is first enriched in a beer still to a 69 mol % ethanol, 31 mol % water product which is then dehydrated by extractive distillation with gasoline as the extractive agent. Gasohol is produced directly. In one version of the process, a heavy cut of gasoline, presumed available at a refinery before blending in of light components, is used as the extractive agent. The enriching column overhead vapors are used to reboil the extractive distillation and a steam stripping columns and to contribute to the preheating of the fermentor beer feed. Light components are blended into the heavy cut-ethanol bottom product from the extractive distillation column to form the desired gasohol. Energy requirements, including feed preheat, are 11,000 Btu per gallon of ethanol in the product gasohol. One hundred and fifty pound steam is required. In a second version, full range gasoline is used as the extractive agent. DOE

N83-29424# California Univ., Livermore. Lawrence Livermore Lab.
SYNFUEL FROM FUSION: USING THE TANDEM MIRROR REACTOR AND A THERMOCHEMICAL CYCLE TO PRODUCE HYDROGEN
Richard W. Werner, ed. 1 Nov. 1982 546 p refs Prepared in cooperation with California Univ., Davis and Washington Univ., Seattle and General Atomic Co., San Diego
(Contracts W-7405-eng-48; DE-AMOG-76RL-0222S; DE-TA06-76ET-52047)
(DE83-005216; UCID-19609) Avail: HC A23/MF NTIS A01

Topics cover: (1) the tandem mirror reactor and its physics; (2) energy balance; (3) the lithium oxide canister blanket system; (4) high-temperature blanket; (5) energy transport system-reactor to process; (6) thermochemical hydrogen processes; (7) interfacing the GA cycle; (8) matching power and temperature demands; (9) preliminary cost estimates; (10) synfuels beyond hydrogen; and (11) thermodynamics of the H2SO4-H2O system. DOE

N83-29425# Los Alamos Scientific Lab., N. Mex.
KINETICS OF THE THERMAL DECOMPOSITION OF SOLID PETN
G. D. Miller (Mound Lab.), L. D. Haws, and R. H. Dinegar 1982 21 p refs Presented at the 19th Intern. Symp. on Combust., Haifa, Israel, 8-13 Aug. 1982
(Contract W-7405-eng-36)
(DE82-004368; LA-UR-82-3416; CONF-820801-1) Avail: NTIS HC A02/MF A01

The thermal decompositon of PETN below its melting point was investigated. Separate monitoring of six product gases allowed individual initial rates of reaction and activation energies to be calculated. The activation energies for the production of both N2O and H2O are between 50 and 56 kcal.mol, pointing to a single process operant over the entire temperature range 363 to 408 K. The other four observed products have activation energies that are significantly higher. The activation energies for CO2 and N2 formation are 65 to 66 kcal.mol while those for the production of CO and [NO + NO2] are 71 to 75 kca.mol. Whether these values represent two or only one additional mechanism is not clear, however, for the 2 sigma width uncertainty limits overlap. The processes or process involved in the formation of CO2, N2, CO, and [NO + NO2] appear(s) to change at 373 K, as a dramatic drop in activation energies is observed at lower temperatures. DOE

N83-29426# Los Alamos Scientific Lab., N. Mex.
THREE DIMENSIONAL MODELING OF SHOCK INITIATION OF HETEROGENEOUS EXPLOSIVES
Charles L. Mader and James D. Kershner 1982 20 p refs Presented at the 19th Intern. Symp. on Combust., Haifa, Israel, 8-13 Aug. 1982
(Contract W-7405-eng-36)
(DE82-006145; LA-UR-82-3776; CONF-820801-2) Avail: NTIS HC A02/MF A01

The basic processes is the shock initiation of heterogeneous explosives have been investigated theoretically using a model of a cube of nitromethane containing 91 cubic air holes. The interaction of a shock wave with the density discontinuities, the resulting hot spot formation and interaction, and the buildup to propagating detonation were computed using three dimensional numerical Eulerian hydrodynamics with Arrhenius chemical reaction

and accurate equations of state. The basic process in the desensitization of a heterogeneous explosive by preshocking with a shock pressure too low to cause propagating detonation was numerically modeled. DOE

N83-29427# Los Alamos Scientific Lab., N. Mex. Initiating and Pyrotechnic Components Div.
PRESS: A COMPUTER PROGRAM FOR EVALUATING EXPLOSIVE-MATERIAL LOADING PROCESSES
O. L. Burchett 1982 19 p refs Presented at the 8th Intern. Pyrotechnics Symp., Steamboat Springs, Colo., 12 Jul. 1982
(Contract DE-AC04-76DP-00789)
(DE82-015256; SAND-82-0338C; CONF-820710-7) Avail: NTIS HC A02/MF A01

The loading process for an explosive device must control within fixed tolerances not only the amount but the length of the explosive material that is compacted in the device's chargeholder. Most loading processes are empirically determined to achieve the desired tolerances with respect to the amount and length of the explosive material that is compacted in the chargeholder of the explosive device. An acceptable loading process for an explosive device can be established analytically by using the computer program, PRESS, which utilizes the known compaction behavior of the explosive material and a simple one dimensional analysis to determine the effect of chargeholder friction and the applied compaction pressure on the final dimensions and the stress density states of the compacted explosive material. DOE

N83-29428# Sandia Labs., Albuquerque, N. Mex.
PYROTECHNIC DEFLAGRATION VELOCITY AND PERMEABILITY
D. R. Begeal and P. L. Stanton 1982 17 p refs Presented at the 8th Intern. Pyrotechnics Symp., Steamboat Springs, Colo., 12 Jul. 1982
(Contract DE-AC04-76DP-00789)
(DE82-014100; SAND-82-0472C; CONF-820710-3) Avail: NTIS HC A02/MF A01

Particle size, porosity, and permeability of the reactive material have long been considered to be important factors in propellant burning rates and the deflagration-to-detonation transition in explosives. It is reasonable to assume that these same parameters will also affect the deflagration velocity of pyrotechnics. An experimental program is described that addresses the permeability of porous solids (particulate beds), in terms of particle size and porosity, and the relationship between permeability and the behavior of pyrotechnics and explosives. The experimental techniques used to acquire permeability data and to characterize the pyrotechnic burning are discussed. Preliminary data have been obtained on the burning characteristics of titanium hydride/potassium perchlorate and boron/calcium chromate. DOE

N83-29429# Sandia Labs., Albuquerque, N. Mex.
SHOCK SENSITIVITY OF THE EXPLOSIVE 2-(5-CYANOTETRAZOLATO) PENTAAMINE COBALT(3) PERCHLORATE (CP)
D. J. Fogelson and A. C. Schwarz 1982 9 p refs Presented at the 8th Intern. Pyrotechnics Symp., Steamboat Springs, Colo., 12 Jul. 1982
(DE82-013637; SAND-82-0478C; CONF-820710-2) Avail: NTIS HC A02/MF A01

The inorganic explosive 2-(5-Cyanotetrazolato) Pentaamine Cobalt(III) Perchlorate, more commonly designated CP, is used in a number of hot-wire initiated deflagration-to-detonation detonators. Analyses of the safety aspects of these detonators are dependent upon utilizing shock initiation sensitivity data on this explosive where sensitivity is defined as the amplitude (P) and duration (tau) of the shock stimulus which produces a 50% probability of initiation. In this work the shock sensitivity of CP powder pressed to 1.50 Mg/cu m bulk density was determined using flyer plate impact techniques which provided pulse durations of 0.17 microsecond and 0.23 microsecond and pulse amplitudes of 0.8 to 2.3 GPa. Impact tests were conducted in air and vacuum, and with flyers of different area. It was necessary to develop a new test technique to generate flyer velocities to bracket the threshold of initiation for this study. This was done by electrically exploding a metal foil against a lucite shock-moderator from which a plastic flyer lifted off at a controlled velocity. DOE

N83-29430# Sandia Labs., Albuquerque, N. Mex.*
THE CHARACTERIZATION AND PERFORMANCE OF THIRTEEN BORON/CALCIUM CHROMATE PYROTECHNIC BLENDS, 2
J. W. Rogers, Jr. 1982 18 p refs Presented at the 8th Intern. Pyrotech. Symp., Steamboat Springs, Colo, 12 Jul. 1982
(Contract DE-AC04-76DP-00789)
(DE82-014693; SAND-82-1001C; CONF-820710-5) Avail: NTIS HC A02/MF A01

Firing energies were obtained and they are compared with differential thermal analysis (DTA) peak shapes, burn rate measurements, surface atomic ratios from X-ray photoemission, fuel and oxidizer surface areas and particle sizes, and magnesium impurities which are usually present in commercially available boron. The DTA peak shape, percent magnesium impurity, and calcium chromate particle size had little or no influence on firing energy or burn rate. However, the boron surface area had a profound effect on pyrotechnic performance. An increase in the boron surface area by a factor of four leads to a factor of thirty increase in burn rate and a decrease in mean firing energy by a factor of two. The burn rate was found to be a smooth, possibly linear, function of the mean firing energy. The B/Ca atomic ratio and burn rate measurements are shown to be useful in empirically predicting the firing energy prior to the relatively expensive test fire sequence. DOE

N83-29431# Tri-State Synfuels Co., Houston, Tex.
TRI-STATE SYNFUELS PROJECT COMMERCIAL SCALE COAL TEST. VOLUME 2A: COLLECTION AND SHIPMENT MINE, BARGE, SHIP AND TRAIN PROGRAMS
Jun. 1982 268 p
(Contract DE-FC05-81OR-20807)
(DE83-007443; DOE/OR-20807/T1-Vol-2A) Avail: NTIS HC A12/MF A01

The collection of Camp 1 coal at the mine in Morganfield, Kentucky and shipment of the sample to Sasolburg, Republic of South Africa is covered. The collection and shipment phase covers the inspection, sampling, preparation and analytical testwork on coal quality and size for the mine, barge, ship and train programs. The samples tested were taken at the following locations: Morganfield and Uniontown, Kentucky; Darrow, Louisiana; and Port Elizabeth and Sasolburg, Republic of South Africa. The analytical program involved complete sieve and physical/chemical characterization of the total sample and coarse and fine fractions, including ASTM and RCRA leaching tests. The coal was dry screened at 1/4-inch round hole size to simulate gasifier feed quality and boiler feed quality. A representative portion of the shipment coal was taken to build up a 200-ton stockpile simulating dead storage at Uniontown for purposes of monthly oxidation or weathering and leaching tests for one year duration. DOE

N83-29432# Pacific Northwest Lab., Richland, Wash.
FORMATION OF AROMATIC AND POSSIBLE OLIGOMERIC MATERIALS FROM CELLULOSE LIQUEFACTION
Janet A. Russell, David A. Nelson, Peter M. Molton, Kathi R. Hansen, and Steven D. Landsman Dec. 1982 24 p refs Presented at the Energy From Biomass and Wastes Symp., Lake Buena Vista, Fla., 24 Jan. 1983
(Contract DE-AC06-76RL-01830)
(DE83-005558; PNL-SA-11022; CONF-830114-3) Avail: NTIS HC A02/MF A01

The formation of cellulose liquefaction oils may aid the development of a renewable liquid fuel from biomass. Aqueous, alkaline liquefaction of cellulose is a complex process which produces an oil containing high proportions of oxygenated and aromatic compounds. These product compounds result from the recombination of cellulose fragments; mechanisms implicated by earlier work included aldol and Micheal reactions. The mechanism of formation of 2,5-dimethylbenzoquinone is discussed. Di-

ethylbenzoquinone is formed from the condensation of 3-hydroxy-2-butanone, and is involved in a reduction oxidation reaction to form dimethylhydroquinone. Reactions occurring after the cellulose liquefaction oil was formed include possible oligomerization by auto-oxidation or condensation. The cellulose oils show rapid viscosity increases not associated with water or solvent loss. DOE

N83-29433# Tri-State Synfuels Co., Houston, Tex.
COMMERCIAL SCALE COAL TEST. VOLUME 4: COAL FINES UTILIZATION IN FURNACE BOILERS
Jun. 1983 41 p
(Contract DE-FC05-81OR-20807)
(DE83-007450; DOE/OR-20807/T1-Vol-4) Avail: NTIS HC A03/MF A01

Technical feasibility of coal fines utilization as a boiler fuel in both cyclone and pulverized fuel furnace boilers was examined. The fines examined were representative of the fine fraction of the Camp 1 coal shipment to Republic of South Africa for the commercial scale gasification test. The Camp 1 coal also was selected as the Tri-State Synfuels design coal and as such the sample was characterized both for gasification (coarse fraction) use as well as boiler (fine fraction) use, not only for in-plant steam and power but also for export to nearly potential users. Paul Weir concluded that the Camp 1 raw fines or washed fines are suitable as a potential fuel source in cyclone (wet bottom) and pulverized (dry bottom) furnaces. Paul Weir also identified several provisions that should be considered for the design of the storage, handling and transportation systems for the fine coal due to the ability of the coal to retain moisture. DOE

N83-29434# Chem Systems, Inc., Fairfield, N.J. Research and Development Group.
DEVELOPMENT OF ALCOHOL-BASED SYNTHETIC TRANSPORTATION FUELS FROM COAL-DERIVED SYNTHESIS GASES Final Technical Report, Sep. 1979 - Jul. 1982
15 Dec. 1982 356 p refs
(Contract DE-AC22-79ET-14858)
(DE83-004857; DOE/ET-14858/T2) Avail: NTIS HC A16/MF A01

Chem Systems, Inc. has completed a two-year R and D program formulated to develop catalysts and a reaction system for the conversion of coal derived synthesis gases to alcohol based, synthetic transportation fuels. A four-task approach which included a catalyst formulation and screening phase, a process variables evaluation phase utilizing laboratory-scale and bench-scale reactors, and a technical and economic analysis phase were designed. The major accomplishments and conclusions achieved during the course of the program are summarized below: ALKANOL fuels, containing mixtures of methanol and C2-C6 saturated alcohols, represent a means of incorporating methanol into the gasoline pool while simultaneously circumventing most of the technical problems associated with the use of neat methanol gasoline blends. Preferred catalysts and reaction conditions were identified for the conversion of simulated coal derived synthesis gases to ALKANOLS at high selectivity. DOE

N83-29435# Tri-State Synfuels Co., Houston, Tex.
COMMERCIAL SCALE COAL TEST. VOLUME 1: SELECTION OF CAMP 1 COAL
Jun. 1982 135 p
(Contract DE-FC05-81OR-20807)
(DE83-007436; DOE/OR-20807/T1-Vol-1) Avail: NTIS HC A07/MF A01

Camp 1 coal was selected for a commercial scale gasification test conducted at the Sasol One Plant. The initial coal quality evaluation consisted primarily of The Pennsylvania State University coal data from Illinois Basin Counties. A preliminary collection of Illinois Basin coal quality data was developed to support the selection of coals for potential plant supply and full scale commercial testing. The total sample and coarse and fine fractions were analyzed. The list of potential source mines for the 22,000 short ton sample of raw coal for the test was narrowed to three. The mines were Camp 1, Ken and Providence. Paul Weir Company examined the data and recommended Camp 1 mine since it operates in the seams contiguous to other potential candidate reserve sites and has the ability to transport the mine sample by belt to a barge loading facility to limit production of fines. DOE

N83-29436# Giessen Univ. (West Germany). Inst. fuer Physik.
STUDIES ABOUT ALTERNATIVE PROPELLANTS FOR ION PROPULSION SYSTEMS Final Report
Klaus Groh Bonn Bundesministerium fuer Forschung und Technologie Jan. 1982 36 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
Avail: NTIS HC A03/MF A01

The use of inert gases as alternative propellants for electric propulsion was investigated. The largest electric propulsion system (RIT engine) is evaluated from the physical point of view. By means of the scaling laws, the thruster performance data can be extrapolated. The RF ionization mechanism can be applied up to any diameter. Author (ESA)

N83-29437# Office of Technology Assessment, Washington, D.C.
INCREASED AUTOMOBILE FUEL EFFICIENCY AND SYNTHETIC FUELS. ALTERNATIVES FOR REDUCING OIL IMPORTS. BACKGROUND PAPER 5: WATER AVAILABILITY FOR SYNTHETIC FUELS: AN ASSESSMENT OF CURRENT STUDIES
Oct. 1982 151 p refs
(PB83-152645) Avail: NTIS HC A08/MF A01 CSCL 21D

The hydrologic, institutional, legal, and economic issues involved in assessing and interpreting estimates of water availability for synfuels development in four major river basins: (1) Upper Mississippi, (2) Ohio/Tennessee, (3) Upper Missouri, and (4) Upper Colorado were described and analyzed. GRA

N83-29438# General Electric Co., Philadelphia, Pa.
MARINE BIOMASS PROGRAM: KELP BIOMASS PROGRAM SUMMARY Final Annual Report, Sep. 1980 - Dec. 1981
Alan N. Tompkins Apr. 1982 511 p Prepared in cooperation with Midwest Research Inst.
(PB83-167247; GRI-81-0118) Avail: NTIS HC A22/MF A01 CSCL 21D

Details of the research and development activities undertaken by the General Electric Company and its team of associates for the Solar Energy Research Institute and the Gas Research Institute are provided. The primary objective at the start of work in September 1980 was to provide data necessary to evaluate the technical and economic feasibility of concepts for producing methane from giant California brown kelp cultivated in the ocean waters off the Coast of Southern California. Simultaneously, plans were developed for laboratory and field experiments in kelp biology designed to support these yield studies, as well as plans for continuing the studies of anaerobic digestion process development. As a result of early 1981 program evaluation, the program sponsors decided in May that the work should be directed toward the acquisition of yield data in alternative nearshore test facilities. Project activities were then realigned towards development of two nearshore test facilities from which harvestable yield data will be obtained. GRA

N83-29439# Office of Technology Assessment, Washington, D.C.
INCREASED AUTOMOBILE FUEL EFFICIENCY AND SYNTHETIC FUELS. ALTERNATIVES FOR REDUCING OIL IMPORTS. BACKGROUND PAPER NUMBER 3: ENVIRONMENTAL ISSUES OF SYNTHETIC TRANSPORTATION FUELS FROM COAL
Nov. 1982 114 p refs
(PB83-161851) Avail: NTIS HC A06/MF A01 CSCL 21D

Environmental impacts from large scale commercialization of coal liquefaction are important to government, industry, the public, and a variety of interest groups. Environmental issues associated with coal liquefaction processes are reviewed by addressing the following topics: a comparison of the environmental differences among technologies; a comparison of the impacts among different coal regions; a description of the uncertainty of synfuels data and

environmental effects; and an identification of problems aggravated by accelerated development schedules. GRA

N83-29440# Office of Technology Assessment, Washington, D.C.
INCREASED AUTOMOBILE FUEL EFFICIENCY AND SYNTHETIC FUELS: ALTERNATIVES FOR REDUCING OIL IMPORTS. BACKGROUND PAPER NUMBER 4: ENVIRONMENTAL ISSUES OF SYNTHETIC TRANSPORTATION FUELS FROM COAL
Dec. 1982 214 p refs
(PB83-161919) Avail: NTIS HC A10/MF A01 CSCL 21D

A state of the art review of the environmental problems, including: a comparison of environmental differences among competing synfuels technologies; an evaluation of the environmental differences between strict and lenient levels of control; an identification of impacts aggravated by accelerated development; a comparison of significant differences in impacts among coal-producing regions; and a description of the uncertainty of synthetic fuels environmental data and environmental effects is provided. The processing and end-use phases of coal liquefaction technology to produce transportation fuels during the next several decades is emphasized. GRA

N83-29441# Environmental Protection Agency, Ann Arbor, Mich. Control Technology Assessment and Characterization Branch.
SUMMARY OF STATUS OF ENVIRONMENTAL PROTECTION AGENCY (EPA), OFFICE OF MOBILE SOURCES CHARACTERIZATION PROJECTS AS OF MARCH, 1982
Thomas M. Baines Oct. 1982 63 p refs
(PB83-163972; EPA/AA/CTAB/PA/82-8) Avail: NTIS HC A04/MF A01 CSCL 21D

This report announces the assessment of Environmental Protection Agency (EPA) Office of Mobile Source Air Pollution Control (OMSAPC) work on regulated and unregulated emissions from a variety of current and prototype engines. Extensive work is underway investigating the influence of various fuels on light duty vehicle and heavy duty engine emissions. This work includes projects on alternate fuels such as methanol as well as fuels derived from coal or oil shale. Other projects include diesel engine characterization studies and evaluating aldehydes from high mileage catalyst equipped motor vehicles. GRA

N83-29442# Steam and Fuel Users' Association of India, Madras. Joint School Compound.
PROCEEDINGS OF A NATIONAL SEMINAR ON ENERGY CHALLENGE OF THE EIGHTIES
Nov. 1981 181 p Proc. held in Madras, 27-29 Nov. 1981
(PB83-164764) Avail: NTIS HC A09/MF A01 CSCL 21D

Energy is the ultimate factor in deciding the development of a country because every piece of equipment requires electrical energy as motive force. There is always a tremendous increase in demand as against the depleting nature of the conventional fossil fuels. There is now a remarkable global shift to coal from oil but that too cannot be the permanent solution. The proceedings contain the various papers presented at the seminar. A total number of 22 papers were presented. The broad subjects covered are: Energy Recovery; Energy and Environment; Boilers; Water as a Source of Fuel; Role of Sugar Industry; Energy Conservation; and Energy Alternatives. GRA

N83-29443# International Harvester Co., Hinsdale, Ill.
METHANOL FROM LANDFILL GAS: TECHNOLOGY AND ECONOMICS Final Report
J. Bradford Hollomon Albany, N.Y. New York State Energy Research and Development Authority Dec. 1982 82 p refs
(PB83-169144; NYSERDA-82-24; Rept-432-ET-FUC-82) Avail: NTIS HC A05/MF A01 CSCL 21D

The study consists of a detailed conceptual process design for an integrated facility, including cost estimates and financial analysis; the results of a laboratory investigation of the composition of gas from the Fresh Kills landfill on Staten Island, and a market analysis of potential methanol uses and plant sites in New York State. The conditions under which operation of a methanol plant would be economical are addressed, as well as strategies for introducing methanol into the marketplace. In addition, the details on the extensive chemical data developed during the project concerning contaminants which might affect process performance or economics are included. GRA

N83-29444# Oklahoma Univ., Norman. School of Chemical Engineering and Materials Science.
DEVELOPMENT OF IMPROVED CAPABILITIES FOR COMPUTATION OF GAS SUPERCOMPRESSIBILITY FACTORS AND OTHER PROPERTIES Annual Report, Jul. 1981 - Jun. 1982
K. E. Starling, K. H. Kumar, J. L. Savidge, M. A. Ghannudi, M. Abreu, B. Eckhardt, J. L. Tateya, R. Hisle, J. Selvidge, and W. Becraft Chicago Gas Research Inst. Jul. 1982 52 p refs Sponsored by Gas Research Inst.
(PB83-173369; GRI-81-0097) Avail: NTIS HC A04/MF A01 CSCL 21D

Research carried out during the first year of a three year project to develop improved capabilities for the computation of gas supercompressibility factors and other properties for the gas industry is reported. An evaluation of the present methods of gas supercompressibility factor calculations in the U.S. gas industry was made. This study points out the need for the development of a new supercompressibility factor correlation. An elaborate literature search was conducted to collect pertinent available experimental data and then these data were processed into a computer data bank. An evaluation of the collected data for the major components of natural gas indicated the need for more accurate data and also for new data. A document reviewing the project objectives, the correlation methodology to provide the rationale for the data needed, a review of the available data for first priority level systems, the actual data needs, and the temperature, pressure and composition ranges was prepared. Initial efforts on the correlation development are also reported herein. GRA

N83-29445# Pennsylvania State Univ., University Park.
IMPORTANCE OF ACTIVE SITES FOR CHAR GASIFICATION IN OXYGEN (AIR) AND CARBON DIOXIDE Final Report, Oct. 1979 - Sep. 1982
P. L. Walker, Jr., R. G. Jenkins, and L. R. Radovic Chicago Gas Research Inst. Oct. 1982 284 p refs Sponsored by Gas Research Inst.
(PB83-173393; GRI-82-0024) Avail: NTIS HC A13/MF A01 CSCL 21D

The fundamental parameters that determine char reactivity were investigated. Chars were prepared from raw and pretreated lignite under widely varying conditions of pyrolysis heating rate, temperature and residence time. The gasification reactivity of the chars was determined by isothermal thermogravimetric analysis, mostly in 0.1 MPa air, but also in 0.1 MPa CO2 and 3.1 kPa H2O. A detailed analysis of the surface properties of the chars was performed. A very wide range of reactivites of the chars was achieved by varying the conditions of pyrolysis and pretreatment of the lignite. The commonly observed and heretofore empirically treated coal char deactivation with increasing severity of pyrolysis conditions was correlated with a decrease in measurable fundamental properties of the chars. GRA

N83-29214*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FUEL VAPORIZATION EFFECTS
Maria A. Bosque *In its* Combust. Fundamentals Res. Mar. 1983 p 49-54 (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 21D

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N83-29446*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CURVED CAP CORRUGATED SHEET Patent

Randall C. Davis, Thomas T. Bales, Dick M. K. Royster, and L. R. Jackson, inventors (to NASA) Issued 1 Jul. 1983 15 p
(NASA-Case-LAR-12884-1; US-Patent-Appl-SN-510136) Avail: NTIS HC A02/MF A01 CSCL 13B

The invention is a structure for a strong, lightweight corrugated sheet. The sheet is planar or curved and includes a plurality of corrugation segments, each segment being comprised of a generally U-shaped corrugation with a part-cylindrical crown and cap strip, and straight slide walls with secondary corrugations oriented at right angles to said side walls. The cap strip is bonded to the crown and the longitudinal edge of said cap strip extends beyond edge at the intersection between said crown and said side walls. The high strength relative to weight of the structure makes it desirable for use in aircraft or spacecraft. NASA

N83-29447# Laser Technology, Inc., North Hollywood, Calif.
CUTTING WITH DIAMOND WIRE: CUTTING PROCEDURES AND SUGGESTED USES
Howard B. McLaughlin [1982] 15 p
Avail: NTIS HC A02/MF A01

Diamond impregnated wire is the most versatile cutting tool yet devised. When a wire is properly charged with diamond particles and is drawn back and forth over a material surface, it does a remarkable cutting job. In a number of cases, wire sawing is the only way to perform these operations successfully: (1) for materials which are so fragile that other means of cutting will cause breakage, damage to crystal structure or otherwise impair the specimens, often rendering them useless, (2) for cutting materials which are so expensive that kerf loss becomes a major factor, a wire of the proper diameter with carefully graded diamonds, results in the minimum loss of material, (3) for cutting materials which may be damaged by the frictional heat generated by the high speed abrasive wheels, band saws and other cutting devices, causing hair cracks and craze. S.L.

N83-29448*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CAD OF CONTROL SYSTEMS: APPLICATION OF NONLINEAR PROGRAMMING TO A LINEAR QUADRATIC FORMULATION Final Report
Peter Fleming (University Coll. of North Wales) Jun. 1983 9 p refs
(Contract NAS1-17070)
(NASA-CR-172151; ICASE-83-24; NAS 1.26:172151) Avail: NTIS HC A02/MF A01 CSCL 13B

The familiar suboptimal regulator design approach is recast as a constrained optimization problem and incorporated in a Computer Aided Design (CAD) package where both design objective and constraints are quadratic cost functions. This formulation permits the separate consideration of, for example, model following errors, sensitivity measures and control energy as objectives to be minimized or limits to be observed. Efficient techniques for computing the interrelated cost functions and their gradients are utilized in conjunction with a nonlinear programming algorithm. The effectiveness of the approach and the degree of insight into the problem which it affords is illustrated in a helicopter regulation design example. Author

N83-29449# College of Aeronautics, Cranfield (England).
DESIGN AND DEVELOPMENT OF A DISC-WINDMILL ATOMIZER FOR AERIAL APPLICATIONS
J. J. Spillman Aug. 1982 14 p refs
(AE-8223; ISBN-0-902937-78-2) Avail: NTIS HC A02/MF A01

To improve the efficiency of aerial applications of pesticides it is essential to get a greater fraction of the emitted formulation to the true biological target. To do this and at the same ensure that environmental pollution is at a minimum requires a careful choice of droplet size spectrum. The best atomizers currently available commercially for aircraft use produce at best only about 40% of their emission in sizes within 25% of the desired size and in many cases the percentages is less than half this value. A wide range of droplet sizes in an emission makes it impossible to achieve the precision placement sprays required for example in herbicide applications and in the treatment of oil slicks, whilst a large fraction of the emission is wasted when small droplets are required. Design of an atomizer to emit most of its output within 25% of a specified size at flow rates suitable for aerial applications was conducted. Author

N83-29450# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
FUEL FIRE TESTS OF SELECTED ASSEMBLIES Interim Report
George Kydd, Kenneth Spindola (Naval Clothing and Textile Research Facility), and Gregory K. Askew 13 Apr. 1982 37 p refs
(AD-A125820; NADC-82121-60) Avail: NTIS HC A03/MF A01 CSCL 13/12

A varing assortment of clothing assemblies was tested in the Fuel Fire Test Facility at the Naval Air Development Center. Included was a Nomex-Kevlar Cloque Coverall which had relatively good protection from fuel flames. Author (GRA)

N83-29451# Army Industrial Base Engineering Activity, Rock Island, Ill. Manufacturing Technology Div.
DARCOM METAL REMOVAL WORKING GROUP Final Annual Report for 1982
Alan L. Peltz Feb. 1983 85 p
(AD-A126054) Avail: NTIS HC A05/MF A01 CSCL 05/2

This document summarizes the activities of the DARCOM Metal Removal Working Group for 1982. It contains an analysis of the metal removal Manufacturing Methods and Technology (MMT) program and outlines recommendations for technology areas which should be addressed in future metal removal MMT projects. GRA

N83-29452# Department of the Army, Washington, D. C.
MASONRY STRUCTURAL DESIGN FOR BUILDINGS
Aug. 1982 279 p refs Supersedes DA-TM-5-809-3; USAF-AFM-88-3-CH-3 Sponsored in part by the Dept. of Air Force and Dept. of the Navy
(AD-A126314; NAVFAC-DM-2.9; USAF-AFM-88-3-CH-3; DA-TM-5-809-3) Avail: NTIS HC A13/MF A01 CSCL 13/13

Masonry structures shall be designed in accordance with the requirements of this manual. Applicable building codes and exceptions thereto are noted in the manual. The structural design information is based upon the engineered design concept in which walls and columns are analyzed on a stress basis which is considered a refinement of commonly used empirical methods. The design curves and sample calculations will materially contribute to the speed and accuracy of the design of brick and concrete masonry buildings. Since some of the referenced Army publications may be in conflict with Navy criteria, engineers using this manual for Navy projects should use applicable Navy criteria. Author (GRA)

N83-29453# Naval Civil Engineering Lab., Port Hueneme, Calif.
EXPERIMENTAL POLYURETHANE FOAM ROOF SYSTEMS, PART 2 Progress Report, Oct. 1975 - Jul. 1981
Robert L. Alumbaugh, John R. Keeton, and Edwin F. Humm (Naval Facilities Engineering Command) Jan. 1983 63 p refs
(AD-A126315; NCEL-TN-1656) Avail: NTIS HC A04/MF A01 CSCL 13/13

An experimental roofing installation is described in which polyurethane foam (PUF) was spray-applied directly to metal Butlerib-type metal decks, the roof divided into five approximately equal areas, and the PUF protected with five different elastomeric coating systems. Three of the coating systems were damaged by hailstones about a year after installation; these systems were recoated within 3 years of the initial installation. The current coatings include two of the original coating systems - a plural component silicone and a single component silicone - and those applied over the three systems damaged by hail - a single component silicone, an aluminum filled, hydrocarbon-extended catalyzed urethane, and a catalyzed urethane. The performance of these five PUF systems over a 7-year period is reported. The temperature distributions throughout the roof systems are de-

scribed. The decay in the thermal conductivity of the PUF roof over a 5-year period is presented, and the energy savings realized by foaming the roof are presented. Author (GRA)

N83-29454# Janis Research Co., Inc., Stoneham, Mass.
TECHNICAL MANUAL FOR CONTINUOUS FLOW LHe4 CRYOPUMP J.N. 2977 Final Report, Mar. - Dec. 1982
John D. Ramsden Hanscom AFB, Mass. AFGL 19 Dec. 1982 22 p
(Contract F19628-82-C-0071; AF Proj. 6687)
(AD-A125833; AFGL-TR-82-0395) Avail: NTIS HC A02/MF A01 CSCL 20/12

This report concerns the operation and maintenance of the liquid helium condensation cryopump system built for and in collaboration with the Air Force Geophysics Laboratory at Hanscom AFB. The first section briefly describes the theory of operation and discusses the precautions that should be taken when using the system. The second section describes the system and assembly procedures. The third section explains how to use the storage dewar. The fourth section describes the operating procedure of the cryopump. In the fifth section troubleshooting and maintenance procedures are explained. All relevant drawings and tables are included in the sixth and last section. GRA

N83-29455# Army Cold Regions Research and Engineering Lab., Hanover, N. H. Geophysical Sciences Branch.
ANALYSIS OF ROOF SNOW LOAD CASE STUDIES: UNIFORM LOADS
Michael ORourke (Rensselaer Polytechnic Inst.), Paul Koch (J. Ray McDermott Co.), and Robert Redfield Jan. 1983 34 p refs (DA Proj. 4KD-78012-AAM-1)
(AD-A126330; CRREL-83-1) Avail: NTIS HC A03/MF A01 CSCL 13/13

Roof snow load case studies gathered throughout the United States over a three-year period are analyzed. The objective of the analysis is to determine a relationship between the snow load on the ground and the corresponding uniform snow load on flat and sloped roofs. The main parameters considered are the thermal characteristics of the roof, the roof slope and the exposure of the structure. Exposure has the strongest effect on the ratio of ground to roof snow loads. Comparisons are made with existing and proposed building codes and standards. Author (GRA)

N83-29456# Boeing Aerospace Co., Seattle, Wash.
SOLAR PROJECT DESCRIPTION. HOUSTON CONSTRUCTION COMPANY SINGLE FAMILY RESIDENCE, EDEN PRAIRIE, MINNESOTA MARCH 19, 1982
1982 59 p
(Contracts DE-AB01-76CS-31020; HUD-H-2372)
(DE82-012337; SOLAR/1006-82/50) Avail: NTIS HC A04/MF A01

The Houston Construction Company solar energy system is designed to provide 62 percent of the space heating and domestic hot water energy requirements for a single-family detached residence containing 1796 square feet. The residence is in Eden Prairie, MN. Energy collection is accomplished by 468 square feet of Solaron flat-plate collectors which face south at an angle of 60 degrees from the horizontal. air is the medium for transfer of solar energy from the collectors to either the conditioned space or storage. Storage is a 314 cubic foot bin containing approximately 24,000 lbs of crushed rock located in a utility room. when solar energy is inadequate to satisfy the requirements of the space heating subsystem, auxiliary thermal energy is supplied from an 80,000 Btu per hour natural gas furnace. Domestic hot water is provided by a 30,000 Btu per hour natural gas water heater if the solar contribution is insufficient. DOE

N83-29457# Sandia Labs., Albuquerque, N. Mex.
WATER RELEASE FROM HEATED CONCRETES
Lawrence A. Kent Mar. 1982 23 p refs
(Contract DE-AC04-76DP-00789)
(DE82-015196; NUREG/CR-2279; SAND-81-1732) Avail: NTIS HC A02/MF A01

Water release from three concretes as a function of temperature has been determined experimentally. Limestone concrete releases more water at a moderate temperature than do magnetite or basalt concretes. The amount of water in the concretes is 6.2%, 6.3%, and 5% by weight for limestone, basalt and magnitite concretes, respectively. All of the concretes show three distinct weight losses as a function of temperature. By 450K, 52 to 75 percent of the water is lost - all of the water is lost by 750 to 800 K. DOE

N83-29458# California Univ., Livermore. Lawrence Livermore Lab.
TOWARD A METROLOGY FOR PRECISION-MACHINE-TOOL CONTROL SYSTEMS
C. L. Pomernacki, H. K. McCue, and L. E. Newton 20 Jul. 1982 23 p
(Contract W-7405-eng-48)
(DE82-018077; UCID-19434) Avail: NTIS HC A02/MF A01

The difficulty of determining the source of an error in the performance of the control system of a computer numerically controlled (CNC) precision machine tool is discussed and recommendations are made for error isolation using the Machine Control System Meterology Tree. These recommendations refer to types of tests for specific errors and to a possible architecture for a CNC performance tester. It is concluded that there is a need for both a control system metrology and for establishing standards of performance and testing methods for precision machine tool control systems. DOE

N83-29459# Zweckverband Landeswasserversorgung, Stuttgart (West Germany).
COMPACT FLOCCULATION SYSTEM WITH SLUDGE AND SEPARATORS AND THICKENERS AT THE LANGENAU WATERWORKS. DEVELOPMENT AND CONSTRUCTION OF A HIGH-CAPACITY FLOCCULATION SYSTEM Final Report, May 1982
Gerhard Werner Bonn Bundesministerium fuer Forschung und Technologie Apr. 1983 96 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-037; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 20

A high-capacity flocculation method for processing river water into high grade drinking water is presented. Each step of the flocculation process is related to an exactly measured reaction space fitted with an agitator with adjustable speed. The sludge blanket is separated by lamellar separators. The two-way compact flocculation system ensures optimum purification even of extremely impure untreated water, with a flow-through time of 20 min. The amount of solids in the effluent is $< 0,5$ ppm. The possibility of operating the former flocculation systems as bioreactors allows two stage biological NH4 elimination, and thus chlorine-free treatment even during cold months. Author (ESA)

N83-29460# Akron Univ., Ohio. Dept. of Civil Engineering.
LATEX IMPROVEMENT OF RECYCLED ASPHALT PAVEMENT Final Report
Clarence Drennon Aug. 1982 59 p refs Sponsored in part by Ohio Dept. of Transportation
(PB83-152694; FHWA/OH-82/006) Avail: NTIS HC A04/MF A01 CSCL 13C

The performance of a single unmodified milled recycled asphalt concrete was compared to milled asphalt concrete modified by addition of three types of rubber latex. Latex was added at 2, 3, 5, and 8 percent latex by weight of asphalt in the asphalt concrete. Lattices used were a styrene butadiene (SBR), a natural rubber (NR), an acrylonitrile butadiene (NBR), and four varieties of out of specification SBR lattices. Marshall tests, while indecisive, showed a modest improvement in properties of SBR and NR added material at 3 and 5 percent latex. Addition of NBR latex caused deterioration in Marshall stability and flow over that of control. Repeated load tests were run using the indirect tensile test, analyzed by the VESYS program, which computes life of pavements. Repeated

load tests showed improvement in asphalt concrete life when 3 and 5 percent SBR was added. Improvement was also shown by the out of specification SBR. GRA

N83-29461# Texas Transportation Inst., College Station.
FIELD ENVIRONMENTAL EVALUATION PLAN FOR SULFUR USE IN PAVEMENTS Final Report, Jun. 1978 - Feb. 1982
D. Saylak, L. E. Deuel, J. O. Izatt, C. Jacobs, R. Zahray, and S. Ham Washington FHWA Jul. 1982 61 p refs
(Contract DOT-FH-11-9457)
(PB83-156687; FHWA/RD-80/192) Avail: NTIS HC A04/MF A01 CSCL 13C

The use of sulfur in highway paving mixtures is discussed. The evaluation procedures deal with the safety and environmental aspects of storage and handling, formulation, construction, operation and maintenance of highway pavements containing sulfur, including the possible generation of noxious and abnoxious fumes, dust and gases. Methods and equipment for monitoring potential emissions and pollutants are recommended and safety practices for the handling of sulfur and sulfur-modified asphalt mixtures and pavements are discussed. GRA

N83-29462# Massachusetts Inst. of Tech., Cambridge. Sea Grant College Program.
COMPUTER SIMULATION AND CONTROL OF UNDERWATER VEHICLES
Homayoon Kazerooni and Thomas B. Sheridan Oct. 1982 154 p refs
(Grant NA81AA-D-00065)
(PB83-150532; MITSG-82-19) Avail: NTIS HC A08/MF A01 CSCL 13J

The digital simulation of underwater inspection vehicles is described. The dynamics and kinematics of the underwater vehicles were studied in terms of the differential equations which can present the three dimensional motion of the vehicle (rotational and translational motion). In order to bring the motion of the vehicle under the control of the operator in a supervisory fashion, several control algorithms were described. The digital dynamic models of two underwater vehicles ALVIN and RCV150 were used to simulate the control algorithms in performing some complicated tasks such as bottom following. The results are shown in terms of computer graphic pictures. GRA

N83-29463# National Bureau of Standards, Washington, D.C. National Engineering Lab.
PROCEEDINGS OF THE 6TH ANNUAL CONFERENCE ON FIRE RESEARCH Final Report
Sonya M. Cherry Nov. 1982 185 p refs Proc. held in Washington, 20-22 Sep. 1982
(PB83-155887; NBSIR-82-2612) Avail: NTIS HC A09/MF A01 CSCL 13L

Extended abstracts of grants and contracts for fire research sponsored by the Center for Fire Research and the National Bureau of Standards are given, as well as descriptions of the internal programs of the Center for Fire Research. Fire prevention, toxicology, combustion physics, and risk analysis are discussed. GRA

N83-29464# Illinois Univ., Urbana-Champaign. Dept. of Civil Engineering.
SEISMIC ENERGY ABSORPTION IN SIMPLE STRUCTURES
Tony F. Zahrah and William J. Hall Jul. 1982 227 p refs
(Grants NSF ENV-77-07190; NSF PFR-80-02582)
(PB83-143917; UILU-ENG-82-2011; SR-SER-501; NSF/CEE-82053) Avail: NTIS HC A11/MF A01 CSCL 13M

The energy absorption in, and the inelastic behavior of simple structures during strong earthquake excitation are investigated to determine each structure's response to various types of ground motion and to identify the factors that influence structural deformation and damage. The investigation focuses on the total amount of energy imparted to structure, the amount of energy dissipated in the structure by inelastic deformation and by damping, the displacement ductility the structure experiences, and the number of yield excursions and reversal the structure goes through during the excitation. The effects of duration of ground motion on earthquake response are also investigated and, based on the amount of energy imparted to structures, a possible effective motion criterion is defined. Two methods of scaling ground motion records for equal damage potential are examined. GRA

N83-29465# California Univ., Berkeley. Earthquake Engineering Research Center.
STATES OF THE ART AND PRACTICE IN THE OPTIMUM SEISMIC DESIGN AND ANALYTICAL RESPONSE PREDICTION OF R/C FRAME-WALL STRUCTURES
A. E. Aktan and Vitelmo V. Bertero Jul. 1982 77 p refs
(Grants NSF PFR-79-08984; NSF CEE-81-07217)
(PB83-147736; UB/EERC-82/06; NSF/CEE-82013) Avail: NTIS HC A05/MF A01 CSCL 13M

The states of the art and practice in seismic design and analysis of R/C frame-coupled wall structural systems are evaluated. The major source of evaluations was based on integrated analytical and experimental investigations of the seismic responses of a 15-story R/C frame-coupled wall structural system, used as the example in these evaluations. The step by step design of the 15 story structure was carried out by considering each pertaining provision of the 1973 UBC, 1979 UBC, and ATC 3-06, which were considered to represent the state of the practice. GRA

N83-29466# Meyer (W. E.), State College, Pa.
SYNTHESIS OF FRICTIONAL REQUIREMENTS RESEARCH Final Report
W. E. Meyer Jun. 1982 97 p refs Sponsored by Federal Highway Administration
(PB83-156315; FHWA/RD-81/159) Avail: NTIS HC A05/MF A01 CSCL 13B

Accident data, though useful as indicators of needed safety measures, have not been found to provide a satisfactory basis for determining minimum skid resistance values for specific highway locations. Therefore researchers have attempted to deduce from traffic observations the skid resistance demand of normal traffic. It is postulated that if this demand were unviersally accommodated fewer wet-weather accidents would result. The only presently feasible solution is to estimate for various types of maneuver sites the skid resistance values that should safety accommodate all vehicle and drivers under all, but the most exceptional circumstances. Author (GRA)

N83-29467# National Park Service, Atlanta, Ga. Natural Science and Research Div.
REFERENCE MARKER: PHOTOPOINT RESOURCES MANAGEMENT SYSTEM
Jerry L. Case, Patrick L. Toops, and Stephen V. Shabica Dec. 1982 42 p refs
(PB83-163345; R/RM-SER-62) Avail: NTIS HC A03/MF A01 CSCL 13B

A Reference Marker - Photopoint System of monitoring long-term ecological or environmental changes in natural resources is described. The system provides a means of documenting natural and human-related physical changes in a natural resource base. The system has multiple uses, is aesthetically unobtrusive, and sufficiently permanent. The materials required and the procedures for establishing a Reference Marker - Photopoint System are outlined, and examples given of natural and human-related changes. Author (GRA)

N83-29468# California Inst. of Tech., Pasadena.
PREDICTION OF FLOW DEPTH AND SEDIMENT DISCHARGE IN OPEN CHANNELS Ph.D. Thesis
William R. Brownlie 1982 422 p refs
(Grant NSF CEE-79-20311)
(PB83-165696; NSF/CEE-82090) Avail: NTIS HC A18/MF A01 CSCL 13B

Results are presented of a study of two elements that are fundamental to the development of a numerical model for unsteady flows in sand-bed channels. These elements are the relationship

between the hydraulic variables (slope, depth, and velocity) and the predictor of sediment concentration. The approach used to study these relationships is examined. A new more accurate, yet less complex technique is proposed for predicting sediment concentration. A data base of 7027 laboratory and field records is provided in the appendix. Author (GRA)

N83-29469# IFM Akustibyran A.B., Stockholm (Sweden).
INFLUENCE FROM CORIOLIS AND CENTRIPETAL ACCELERATIONS ON IN-SERVICE TIRE VIBRATIONS
Krister Dovstam and Nils-Ake Nilsson Oct. 1981 34 p refs
(PB83-145185; IFM/TR-6.371.01) Avail: NTIS HC A03/MF A01 CSCL 13F

Coriolis and centripetal acceleration were referred to as a conceivable mechanism that could influence tire vibration and its existing noise. If such an influence exists, then a more detailed knowledge could be a powerful tool in developing less noisy tire designs. In the performed analysis the tire tread block is viewed as an Euler/Bernoulli beam of incompressible material. The treatment of the problem included transformation of measured vibration data in the fixed system to the rotating system utilizing a specially developed computer program. GRA

N83-29470# California Univ., Berkeley. Earthquake Engineering Research Center.
AN EVALUATION OF THE DESIGN AND ANALYTICAL SEISMIC RESPONSE OF A SEVEN-STORY REINFORCED CONCRETE FRAME-WALL STRUCTURE
Finley A. Charney and Vitelmo V. Bertero Aug. 1982 199 p refs (Grant NSF PRF-80-09478)
(PB83-157628; NSF/CEE-82064; UCB/EERC-82/08) Avail: NTIS HC A09/MF A01 CSCL 13M

This report describes the analytical studies regarding the response of a reinforced concrete test building that have been conducted at the University of California, Berkeley, as part of a US-Japan cooperative research program on the behavior of structures subjected to earthquake induced loading. This work, which begins with a review of the prototype design according to the 1979 Uniform Building Code specificatoins for seismic resistant buildings, shows that while the test building, a 1/5 scale model of a 7-story reinforced concrete frame-wall structure, does not satisfy all code specifications, it can be considered to be a good design from the point of view of the strong column-weak beam philosophy. The elastic properties of the structure are investigated through the use of flexibility matrices and the inelastic response of the structure to monotonically increasing lateral loads is studied. Author (GRA)

N83-29471# National Bureau of Standards, Washington, D.C. National Engineering Lab.
MODEL OF THE STEADY-STATE PERFORMANCE OF AN ABSORPTION HEAT PUMP
S. A. Klein Oct. 1982 58 p refs Sponsored in part by DOE and ORNL
(PB83-152314; NBSIR-82-2606) Avail: NTIS HC A04/MF A01 CSCL 13A

A mathematical model of the steady-state performance of an absorption heat pump is described. The model is compared with experimental data from a residential-sized water chiller. It is also used to determine the sensitivity of the heat pump performance to its design variables. Author (GRA)

N83-29472# National Bureau of Standards, Washington, D.C. National Engineering Lab.
THERMAL BEHAVIOR OF FINE-GRAINED SOILS. BUILDING SCIENCE SERIES Final Report
Lawrence A. Salomone, William D. Kovacs, and Herbert Wechsler Nov. 1982 107 p refs
(PB83-164400; NBS-BSS-149; LC-82-600636) Avail: NTIS HC A06/MF A01 CSCL 08M

Laboratory thermal probe tests performed on an AASHTO standard reference material (a silty clay) showed that thermal resistivity (C. cm/watt) varies with soil moisture content and dry density. The tests were performed to correlate soil thermal behavior with the limit states of fine grained soils. Over 80 thermal resistivity measurements were made on specimens compacted to various densities and moisture contents. Results are presented which indicate that the optimum moisture content of soils and the Atterberg Limits can be correlated with the thermal behavior of fine grained soils. GRA

N83-29473# National Bureau of Standards, Washington, D.C.
REPORT OF THE 67TH NATIONAL CONFERENCE ON WEIGHTS AND MEASURES 1982
Albert D. Tholen, ed., Louis E. Barbrow, ed., and Ann P. Heffernan, ed. Oct. 1982 332 p Conf. held in Atlanta, 12-16 Jul. 1982
(PB83-167148; NBS-SP-645; LC-26-27766) Avail: NTIS HC A15/MF A01 CSCL 14B

Reports by the several standing and annual committees of the Conference comprise the major portion of the publication. Included also are papers presented by Conference officials and others. Major issues discussed at the National Conference included long range plans for training, enforcement uniformity, national type evaluation programs and a new publication on type evaluation examinations, new design and performance requirements for commercial weighing and measuring instruments, cash and credit sales at retail motor fuel outlets, studies of model State laws and regulations, a tentative code for grain moisture meters, and adoption of several NBS Handbooks by NCWM. GRA

N83-29474# Cornell Univ., Ithaca, N. Y. Dept. of Structural Engineering.
BEHAVIOR AND DESIGN OF REINFORCED CONCRETE COLUMN-TYPE LAPPED SPLICES SUBJECTED TO HIGH-INTENSITY CYCLIC LOADING
B. Sivakumar, Richard N. White, and Peter Gergely Oct. 1982 216 p refs
(Grants NSF PFR-78-02399; NSF CME-80-11115)
(PB83-165134; NSF/CEE-82072) Avail: NTIS HC A10/MF A01 CSCL 13M

The behavior and design of lapped splices in reinforced concrete column type specimens under high intensity flexural cyclic loads was studied. Special attention is focused on the transverse steel requirements of specimens with more than two splices in a layer; the use of offsets in spliced bars; the effect of concrete strength on splice strength and behavior; and the strength of epoxy-repaired splices. Procedures are provided for the design of reinforced lapped splices to sustain at least twenty reversing load cycles beyond yield and a maximum rebar strain at the splice of at least 2.5 times the yield strain. The key aspect of the design is the provision of closely spaced uniformly distributed stirrup ties in the splice region. Equations are developed for the spacing of stirrups and the minimum splice length requirement. GRA

N83-29475# Federal Highway Administration, Washington, D.C. Materials Div.
EPOXY THERMOPLASTIC PAVEMENT MARKING MATERIAL: SUMMARY OF RESEARCH RESULTS AND REVISED SPECIFICATIONS Final Report, Aug. 1980 - Mar. 1982
Brian H. Chollar and Bernard R. Appleman Sep. 1982 39 p
(PB83-164848; FHWA/RD-81/144) Avail: NTIS HC A03/MF A01 CSCL 13B

The results of an extensive laboratory program to establish a specification for an epoxy thermoplastic (ETP) striping material were presented. Laboratory test procedures to evaluate the properties of ETP, the effect of variations in ETP component ratios, and interim specification based on proprietary components for the ETP were established. The results of an investigation of the effects of alternate pigments and resins on the ETP properties were summarized. The test methods and analytical procedures were modified and improved and were evaluated in an interlaboratory test program. GRA

N83-29476# Purdue Univ., Lafayette, Ind. School of Civil Engineering.
STATIC AND SEISMIC LATERAL PRESSURES ON EARTH

RETAINING STRUCTURES, APPENDICES
M. E. Harr Oct. 1982 140 p
(Grant NSF CEE-79-06295)
(PB83-164335; NSF/CEE-82075) Avail: NTIS HC A07/MF A01 CSCL 13B

Three appendices are presented. Appendix A contains static and seismic active and passive earth pressure tables with notations. Appendix B consists of charts for application of the earth pressure tables and other tables. A computer program for calculating the distribution of lateral earth pressure by the modified Dubrova method is presented in Appendix C. GRA

N83-29477# Allied Chemical Corp., Morristown, N.J.
SOLAR ASSISTED GAS-FIRED ABSORPTION HEAT PUMP Final Report, Mar. 1981 - Aug. 1982
K. P. Murphy, J. C. Burke, and B. A. Phillips Aug. 1982 137 p refs
(PB83-167502; GRI-80/0172) Avail: NTIS HC A07/MF A01 CSCL 13B

An evaluation of the technical and economic feasibility of coupling an absorption heat pump and an active solar system for residential applications is discussed. The absorption heat pump is based on a new absorption working pair developed by Allied. Three basic modes of coupling were considered, a series arrangement, a parallel arrangement, and a solar drive arrangement. Little overall difference in performance was found for these three modes but the solar drive was chosen for detailed study. A preliminary design of a dual mode absorption generator was developed capable of using simultaneously heat from gas and solar. The performance of such a system was examined in three cities. GRA

N83-29478# Thermo Electron Engineering Corp., Waltham, Mass.
GLASS BATCH PREHEATER, PHASE 3 Annual Report
Aug. 1982 95 p refs
(PB83-167254; TE4229-383-82; GRI-82/001.2) Avail: NTIS HC A05/MF A01 CSCL 13B

The glass industry uses 300,000,000 MMBtu annually; 50 percent of this energy is natural gas consumed in melting furnaces. A batch preheating system could reduce this energy use 20 percent (saving 30,000,000 MMBtu/yr) while simultaneously reducing the air pollution emissions. Results obtained in the first two phases indicated that a glass batch preheating system is feasible and that the resultant energy savings would pay for the additional equipment in less than a year. The major remaining concern was fouling of the distributor plate. Tests showed that deposits do build up in the heat exchanger. However, the deposits are extremely water soluble and easily cleaned off the plate with a water spray. Author (GRA)

N83-29479# Booz-Allen and Hamilton, Inc., Bethesda, Md.
ASSESSMENT OF RESIDENTIAL PASSIVE SOLAR/GAS-FIRED ENERGY SYSTEMS Final Report, Nov. 1981 - Aug. 1982
David L. Hartman and Alan S. Hirshberg Dec. 1982 138 p
(PB83-167239; GRI-81/0090) Avail: NTIS HC A07/MF A01 CSCL 13B

The study was made to provide a comprehensive analysis of the issues involved in integrating passive solar with gas-fired back-up energy systems including: characterize major passive solar technologies; analyze technical and economic requirements of back-up heating and cooling systems; evaluate potential improvements for gas-fired heating equipment that could enhance its fit with passive solar heating; investigate the feasibility of passive solar cooling coupled with gas dehumidification equipment; and identify R&D opportunities for GRI which offer benefits to the gas ratepayer and to the gas industry. Passive solar heating, because of its potential to significantly reduce home heating loads and of the ease with which electric backup systems can be installed could result in a decrease in gas market share, as a primary heating fuel in new housing. Author (GRA)

N83-29480# American Gas Association Labs., Cleveland, Ohio.
PULSE COMBUSTION RESIDENTIAL WATER HEATER Annual Report, Nov. 1980 - Oct. 1981
R. J. Kolodgy and G. W. Liljenberg Sep. 1982 52 p
(PB83-167221; GRI-80/0158) Avail: NTIS HC A04/MF A01 CSCL 13B

A domestic water heater based on the pulse combustion principle was developed, thus significantly reducing natural gas costs for the residential consumer. With the cost of natural gas rising, it is important to develop fuel efficient residential appliances which are economically attractive to the consumer. The pulse combustion principle was proven to reduce fuel consumption significantly in residential furnaces and is expected to show similar results when applied to domestic water heaters. Direct venting, which is possible with pulse combustion burners, provides an additional economic benefit: the consumer who elects to install a pulse combustion water heater and furnace in a new building will not require a chimney. GRA

N83-29481# Honeywell, Inc., Bloomington, Minn.
RESIDENTIAL COMBUSTION HEATING SYSTEM PERFORMANCE ANALYSIS STUDY Final Report, Feb. 1980 - May 1982
U. Bonne and A. Patani 28 Jun. 1982 202 p
(PB83-161406; GRI-81/0093) Avail: NTIS HC A10/MF A01 CSCL 13B

In this study, the operation of residential, gas-fired combustion heating equipment and performance limitation including an assessment of energy conserving, cost minimizing alternatives, new designs and controls, were analyzed. In addition to analysis of the parametric sensitivity of heating system performance, the authors have defined a number of new concepts that provide an improved system performance description (heat exchanger symmetry, energy distribution factor, cost efficiency, life cycle cost efficiency and rusting time). Author (GRA)

N83-29482# Midland-Ross Corp., Toledo, Ohio. Thermal Systems Technical Center.
INDUSTRIAL BURNER AND PROCESS EFFICIENCY PROGRAM Final Report, Jan. 1979 - Oct. 1982
S. R. Huebner, S. N. Prakash, and D. B. Hersh Oct. 1982 92 p refs
(PB83-161059; GRI-81/0048) Avail: NTIS HC A05/MF A01 CSCL 13B

There is an acute need for a burner that does not use excess air to provide the required thermal turndown and internal recirculation of furnace gases in direct fired batch type furnaces. Such a burner would improve fuel efficiency and product temperature uniformity. A high velocity burner has been developed which is capable of multi-fuel, preheated air, staged combustion. This burner is operated by a microprocessor to fire in a discrete pulse mode using Frequency Modulation (FM) for furnace temperature control by regulating the pulse duration. A flame safety system has been designed to monitor the pulse firing burners using Factory Mutual approved components. The FM combustion system has been applied to an industrial batch hardening furnace (1800 F maximum temperature, 2500 lbs load capacity). Author (GRA)

N83-29483# Institute of Gas Technology, Chicago, Ill.
COMBINED-CYCLE HEAT PUMP ANALYSIS PROGRAM Final Report, Nov. 1980 - Feb. 1982
John A. Kinast and Jaroslav Wurm Dec. 1982 131 p refs
(PB83-161042; GRI-80/0148) Avail: NTIS HC A07/MF A01 CSCL 13B

A tool for comparatively assessing combined cycle heat pump concepts was developed. It is a computer program which, in its basic form considers the effect of dead volumes, finite heat capacity regenerators, and finite levels of heat transfer. It is expandable by the user to consider additional factors that would be desired. In addition, a technique for describing combined cycle heat pumps was developed so that the program may assess such concepts equally. A major feature of the program and technique is that neither use assumptions or constraints of physical layout as do previously developed analysis methods. Because of this, multi-cycle concepts may be described in building block fashion and analyzed without writing complete, design-specific programs. GRA

N83-29484# National Swedish Inst. for Building Research, Stockholm.
WARM AIR SYSTEMS. PART 1: TEMPERATURES AND TEMPERATURE EFFICIENCIES
Mats Sandberg, Claes Blomqvist, and Mats Sjoeberg Oct. 1982 124 p refs 2 Vol.
(PB83-148908; MEDDELANDE/BULL-M82:22-Pt-1; ISBN-91-540-9142-X; ISSN-0347-4348) Avail: NTIS HC A06/MF A01 CSCL 13A

Results are reported from more than a hundred tests of six different warm-air schemes. The findings show significant differences in both thermal and ventilation performance between different systems. The reports are addressed to both practicians and researchers. For the practicians it is felt that the reports generally may serve as a catalog illustrating the performance of different warm-air schemes. Furthermore it is felt that the presentation of tracer gas measurements is of general interest to all involved in these measurements. They illustrate different characteristic decay curves occurring with different air motion patterns in a room. They may therefore serve as an aid to the interpretation of obtained data. Finally, the researchers will hopefully find the data useful in their own research. Author (GRA)

N83-29485# National Swedish Inst. for Building Research, Stockholm.
WARM AIR SYSTEMS. PART 2: TRACER GAS MEASUREMENTS AND VENTILATION EFFICIENCIES
Mats Sandberg, Claes Blomqvist, and Mats Sjoeberg Oct. 1982 158 p refs 2 Vol.
(PB83-148916; MEDDELANDE/BULL-M82:23-Pt-2; ISBN-91-540-9143; ISSN-0347-4348) Avail: NTIS HC A08/MF A01 CSCL 13A

Results are reported from more than a hundred tests of six different warm air schemes. The findings show significant differences in both thermal and ventilation performance between different systems. The reports are addressed to both practicians and researchers. For the practicians it is felt that the reports generally may serve as a cataloge illustrating the performance of different warm air schemes. Furthermore it is felt that the presentation of tracer gas measurements is of general interest to all involved in these measurements. They illustrate different characteristic decay curves occurring with different air motion patterns in a room. They may therefore serve as an aid to the interpretation of obtained data. GRA

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N83-29486 Forschungsinstitut fuer Hochfrequenzphysik, Werthoven (West Germany).
MULTISTATIC SONAR WITH OMNIDIRECTIONAL RECEIVERS
F. Dommermuth Sep. 1982 60 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministeriums der Verteidigung
(Rept-10-82; Lfd-205) Avail: Issuing Activity

A multistatic sonar system, consisting of an all directions simultaneously illuminating projector and several omnidirectional receivers distributed across the surveillance area, is described. Different transmitter receiver configurations and a modified noise model which now includes reverberation are discussed. The radiation pattern of the projector need not be omnidirectional. Only the echo arrival times are transmitted to a central processor. This processor decides whether or not a target is present within the surveillance area and also approximately determines the position of a detected target. The coincidence test is nearly optimal (to about 1 dB equivalent monostatic direction index). With a multistatic system detected targets can be localized as accurately as with a monostatic system with a 25 dB direction index. Author (ESA)

N83-29487 National Physical Lab., Teddington (England). Div. of Information Technology and Computing.
NUMERICAL SOLUTION OF EQUATIONS DESCRIBING ELECTROMAGNETIC PROPAGATION IN DIELECTRIC TUBE WAVEGUIDES
D. H. Ferriss, S. J. Hammarling (Numerical Algorithms Group Ltd., Oxford), D. W. Martin, and A. G. P. Warham Jan. 1983 30 p refs
(NPL-DITC-16/83; ISSN-0262-5369) Copyright. Avail: Issuing Activity

Electromagnetic wave propagation in an infinite dielectric tube, with section defined by two concentric circles and with its central core filled by a dielectric material, embedded in a third dielectric of infinite extent is analyzed. All three materials are considered to be homogeneous and isotropic. The conditions for propagation result in a nonlinear eigenvalue problem defined by a matrix of order eight whose elements include Bessel functions of the phase coefficient. This eigenvalue is computed by a three-point rational interpolation technique. Expressions for transmitted power in the three dielectric regions are derived and evaluated in terms of the elements of the corresponding eigenvector. Author (ESA)

N83-29488# Radio Technical Commission for Aeronautics, Washington, D. C.
MINIMUM OPERATIONAL PERFORMANCE STANDARDS FOR EMERGENCY LOCATOR TRANSMITTERS. AUTOMATIC FIXED, ELT (AF); AUTOMATIC PORTABLE, ELT (AP); AUTOMATIC DEPLOYABLE, ELT (AD); SURVIVAL, ELT (S) OPERATING ON 121.5 AND 243.0 MEGAHERTZ
13 May 1983 82 p Supersedes RTCA/DO-145; RTCA/DO-146 and RTCA/DO-168
(RTCA/DO-183; RTCA/DO-145; RTCA/DO-146; RTCA/DO-168) Avail: NTIS HC A05/MF A01; also available from RTCA Secretariat, Suite 500, 1425 K Street, N.W., Washington, D.C. 20005, $16.00 per copy

Emergency locator transmitter (ELT) performance requirements and test procedures, installed equipment performance, and operational tests are discussed. Author

N83-29489*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
STEREO SIDE-LOOKING RADAR EXPERIMENTS
F. Leberl (Graz Univ.), J. Raggam (Graz Univ.), and M. Kobrick [1980] 7 p refs
(NASA-CR-172905; NAS 1.26:172905) Avail: NTIS HC A02/MF A01 CSCL 17I

The application of side-looking radar images in geoscience fields can be enhanced when using overlapping image strips that are viewed in stereo. A question concerns the quality of stereo radar. This quality is described evaluating stereo viewability and using the concept of vertical exaggeration with sets of actual radar images. A conclusion is that currently available stereo radar data are not optimized, that therefore a better quality can be achieved if data acquisition is appropriately arranged, and that the actual limitations of stereo radar are still unexplored. S.L.

N83-29490# Communications Satellite Corp., Clarksburg, Md.
STUDY OF HIGH POWER L-BAND SPACE TRANSMITTERS FOR 2ND GENERATION INMARSAT Final Report
Michael A. Hulley 8 Jul. 1983 50 p refs
(SCR-518(PSL-83-159)) Avail: NTIS HC A04/MF A01

The developmental status and historical record of high power L-band traveling wave tube amplifiers (TWTAs) in applications relevant to the requirements of the INMARSAT second generation space segment were studied. Visits to ESTEC, Hughes Space and Communications Division (HSC), Hughes Electron Dynamics Division (HEDD), ANT-Nachrichtentechnik (ANT), AEGTelefunken Professional Tubes Division (TFK) were included for up to date briefings on their current work. The technical and schedule risks are reviewed, and reliability estimates given for the two major

competing concepts, namely six for four linearized TWTAs (four 70 W saturated output power 291HA TWTs) and two for one linearized 300 W saturated output power TWTA (TL 2400 or, possibly, 8281H). Each approach, with its set of differing risks, can basically meet the requirements of INMARSAT's (International Maritime Satellite Organization) draft RFP. A few critical areas are proposed where it is thought that further study would be useful. Author

N83-29491*# National Aeronautics and Space Administration, Washington, D. C.
PROPAGATION EFFECTS HANDBOOK FOR SATELLITE SYSTEMS DESIGN. A SUMMARY OF PROPAGATION IMPAIRMENTS ON 10 TO 100 GHz SATELLITE LINKS WITH TECHNIQUES FOR SYSTEM DESIGN
Louis J. Ippolito, R. D. Kaul, and R. G. Wallace Jun. 1983 468 p refs Prepared in cooperation with Operations Research, Inc., Silver Spring, Md.
(Contract NASw-3644)
(NASA-RP-1082(03); NAS 1.61:1082(03); ORI-TR-1905) Avail: NTIS HC A20/MF A01 CSCL 20N

This Propagation Handbook provides satellite system engineers with a concise summary of the major propagation effects experienced on Earth-space paths in the 10 to 100 GHz frequency range. The dominant effect, attenuation due to rain, is dealt with in some detail, in terms of both experimental data from measurements made in the U.S. and Canada, and the mathematical and conceptual models devised to explain the data. In order to make the Handbook readily usable to many engineers, it has been arranged in two parts. Chapters 2-5 comprise the descriptive part. They deal in some detail with rain systems, rain and attenuation models, depolarization and experimental data. Chapters 6 and 7 make up the design part of the Handbook and may be used almost independently of the earlier chapters. In Chapter 6, the design techniques recommended for predicting propagation effects in Earth-space communications systems are presented. Chapter 7 addresses the questions of where in the system design process the effects of propagation should be considered, and what precautions should be taken when applying the propagation results. Author

N83-29492*# Ford Aerospace and Communications Corp., Palo Alto, Calif. Western Development Labs. Div.
SPACECRAFT IF SWITCH MATRIX FOR WIDEBAND SERVICE APPLICATIONS IN 30/20 GHz COMMUNICATIONS SATELLITE SYSTEMS: PROOF-OF-CONCEPT MODEL, EXECUTIVE SUMMARY Final Report
Pang T. Ho, Eugene Coban, and John Pelose 1 Jul. 1983 337 p
(Contract NAS3-22501)
(NASA-CR-168175; NAS 1.26:168175) Avail: NTIS HC A15/MF A01 CSCL 17B

The design and development of a unique coupler crossbar 20 x 20 microwave switch matrix are described. The test results of the proof of concept model that meets the requirements for a high speed satellite switched, time division multiple access (SS-TDMA) system are presented. Author

N83-29493*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
CAPABILITIES, LIMITATIONS, AND USE OF BC SAT-R2 CONFERENCE SOFTWARE
Edward F. Miller 1983 9 p Presented at the BC SAT-R2 Seminar, Lima, 18-22 Apr. 1983; sponsored by the International Frequency Registration Board (IFRB)
(NASA-TM-83383; E-1656; NAS 1.15:83383) Avail: NTIS HC A02/MF A01 CSCL 09B

The computer software developed for the BC SAT-R2 Conference has certain capabilities and limitations which are described. Capabilities of each major program element are addressed with respect to providing the required functions for planning and output reporting. Limitations arise from the inability to exactly represent certain systems that may be examined. Expected use of the software package during the Conference is outlined. Author

N83-29494# European Space Agency, Paris (France).
WAVE PROPAGATION AND REMOTE SENSING
B. Battrick, comp. and E. J. Rolfe, comp. Apr. 1983 543 p refs Partly in ENGLISH and FRENCH Proc. of URSI Commission F Symp., Louvain, Belgium, 9-15 Jun. 1983; sponsored by ESA and EEC
(ESA-SP-194; ISSN-0379-6566) Avail: NTIS HC A23/MF A01

Clear air refractivity and turbulence; rain and dust characteristics; microwave attenuation and crosspolarization; radar and radiometer measurement; surface and volume scattering; multipath effects; and inversion methods were discussed. For individual titles, see N83-29495 through N83-29557.

N83-29495# Royal Norwegian Council for Scientific and Industrial Research, Kjeller. Environmental Surveillance Technology Programme.
WAVE PROPAGATION AND REMOTE SENSING
Dag T. Essing *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p XVII-XXX refs (For primary document see N83-29494 18-32)
Avail: NTIS HC A23/MF A01

A unified set of first order expressions derived from basic physical principles characterizing an electromagnetic scattering object is presented. From these it is shown how the propagation medium affects the results of the various remote sensing techniques. Factors which characterize the propagation medium in relation to communications are derived. It is shown that in regard to the influence of the propagation medium, the problems related to communications are very similar to those of remote sensing. Author (ESA)

N83-29496# Universite Catholique de Louvain (Belgium). Lab. de Telecommunications.
WAVE PROPAGATION IN PRECIPITATION
P. DeLogne *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p XXXI-XLI refs (For primary document see N83-29494 18-32)
Avail: NTIS HC A23/MF A01

A unified model of electromagnetic wave interaction with the precipitation medium is presented. The scattering of an incident monochromatic field by a polydispersion of particles is considered. The radiometric implications of the thermal radiation of a polydispersion are outlined. Propagation through inhomogeneous dispersions, turbulence, and scintillation is treated. Monostatic dual polarization radar remote sensing of polydispersions is covered. Author (ESA)

N83-29497# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Inst. fuer Hochfrequenztechnik.
WAVE SCATTERING BY RANDOM SURFACES AND APPLICATION TO NATURAL SURFACES
E. Lueneburg *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p XLIII-1 refs (For primary document see N83-29494 18-32)
Avail: NTIS HC A23/MF A01

Rough surface scattering theories are reviewed. The phenomenological description of scattering characteristics, and surface modeling are covered. The boundary perturbation, Kirchoff and two-scale methods are discussed. Author (ESA)

N83-29498# British Columbia Univ., Vancouver.
ANALYSIS OF MULTIPATH FADING OBSERVATIONS ON CERTAIN MICROWAVE PATHS IN BRITISH COLUMBIA
N. Owen (British Columbia Telephone Co.), E. Lee, and M. Kharadly *In* ESA Wave Propagation and Wave Sensing Apr. 1983 p 3-11 refs Sponsored by Ottawa Dept. of Communications, British Columbia Telephone Co. and Canadian Natural Sciences and Engineering Research Council (For primary document see N83-29494 18-32)

Avail: NTIS HC A23/MF A01

Multipath fading statistics for 12 microwave links are discussed. Analysis shows that the Morita parameters, of the CCIR formula are most appropriate for British Columbia. The Extended Barnett parameters are more conservative and the Barnett parameters are over conservative. The most active fading period for multipath fading is July to October and the yearly to worst month fading ratio is 2.0 for most links. The peak of the diurnal multipath fading for links over, and along, a body of water is in the afternoon and at sunset. For plateau (or flat terrain), frequent fadings occur around sunrise. For most mountain links, there is no general pattern. The dominant multipath mechanisms are: sea breeze, offshore streaming and advection of nocturnally-cooled air for coastal links; radiation inversion for plateau links; and trapped radiation fog in the valleys associated with upper, clear air for mountain links.

Author (ESA)

N83-29499# Centre National d'Etudes des Telecommunications, Issy-les-Moulineaux (France).

THE PACEM EXPERIMENT ON LINE OF SIGHT MULTIPATH PROPAGATION

M. Sylvain, F. Baudin, C. Klapisz, J. Lavergnat, S. Mayrargue, J. P. Mon, B. Nutten, M. Rooryck, and L. Martin *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 13-23 refs (For primary document see N83-29494 18-32)

Avail: NTIS HC A23/MF A01

Physical factors in multipath transmission were examined along a 37 km overland path. Wideband microwave link analyzer data and measurements of temperature, humidity and wind from the ground up to 300 m were combined. Acoustic sounders monitored the temperature structure of the lower atmosphere and a two frequency lidar gave humidity profiles. Data are used to investigate meteorological situations leading to multipath propagation; to study the propagation medium under these conditions; and to derive short term evolutive models for the temperature and humidity in the boundary layer. Author (ESA)

N83-29500# University of Western Ontario, London. Centre for Radio Science.

MICROWAVE MULTIPATH FROM SEA REFLECTIONS: THE BAY OF FUNDY

A. R. Webster and W. I. Lam *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 25-30 refs (For primary document see N83-29494 18-32)

Avail: NTIS HC A23/MF A01

The amplitude distribution of direct and sea reflected rays on two separate microwave links is examined. Resultant fading statistics are presented for the two data sets, obtained during different seasons. These show significant differences. It is suggested that the cause of much of the deep fading is the formation of atmospheric layers below the line of sight.

Author (ESA)

N83-29501# Centre National d'Etudes des Telecommunications, Lannion (France).

RATES OF CHANGE OF PROPAGATION MEDIUM TRANSFER FUNCTIONS DURING SELECTIVE FADINGS

L. Martin *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 31-35 refs (For primary document see N83-29494 18-32)

Avail: NTIS HC A23/MF A01

Typical parameters of amplitude distortion curves, measured in the 11.25 to 11.65 GHz band, were selected to characterize selective fadings. The relation between the rates of change (ROC) the maximum relative level (An) its associated frequency (Fn), the minimum relative level (Ax) and its associated frequency (Fx), and variations in lower tropospheric layers is discussed. The ROC of Ax are fast because Ax variations depend on variations of phase shifts between components of the received signal multipath fadings. The ROC of An are low, because An is related to the defocusing effect of the antenna beam when particular curvatures of refractive index profiles occur. The ROC of refractive index profile curvatures are low. The ROC of Fx are unexpectedly very fast. The Fx position variations are due to delay variations. The ROC of the ray giving most distortion is on the same order as the layer height variations in multipath fading conditions. Author (ESA)

N83-29502# Hochschule der Bundeswehr, Munich. (West Germany).

DISTORTIONS IN FM CAR RADIOS CAUSED BY MULTIPATH RECEPTION AND THEIR REDUCTION BY MEANS OF ANTENNA DIVERSITY

K. H. Lindenmeier, E. J. Manner, and L. M. Reiter *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 37-44 refs (For primary document see N83-29494 18-32)

Avail: NTIS HC A23/MF A01

Receiving distortions were evaluated statistically for several car antennas under various measuring conditions. The abundance of distortions can be counted for all antennas or for the auxiliary antennas in sequence of a distortion on the main antenna. All antennas are equivalent as far as the number of counts is concerned. By using a 2-antenna system the measured improvement factor in city areas is in the range 5 to 20, and is 2 mountain areas. Author (ESA)

N83-29503# Catholic Univ., Rio de Janeiro (Brazil). Centro de Estudos em Telecomunicacoes.

MEASUREMENTS OF RADIO REFRACTIVE INDEX PROFILES IN TROPICAL AND EQUATORIAL REGIONS AND THEIR INFLUENCE ON LINE OF SIGHT MICROWAVE LINKS

N. R. Dhein *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 49-55 refs (For primary document see N83-29494 18-32)

Avail: NTIS HC A23/MF A01

The fine structure of refractive indexes were obtained through the vertical displacement of refractometers along towers. Results show that the tropospheric duct is the main cause of fading in line of sight microwave communication. A refractometer system furnished a continuous recording of the K factor. A large diurnal variation of this parameter is reported. Author (ESA)

N83-29504# Centre National d'Etudes des Telecommunications, Issy-les-Moulineaux (France).

PROPAGATION ANOMALIES IN A 4.7 AND 11 GHz LINE OF SIGHT PATH

G. Roux and J. P. Mon *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 57-68 refs (For primary document see N83-29494 18-32)

Avail: NTIS HC A23/MF A01

The meteorological conditions leading to multipath propagation during two summer months were studied. The levels of HF carriers were recorded on a 48 km path and, simultaneoustly, acoustic sounding monitoring of the lower atmosphere was performed at midpath together with temperature, humidity and pressure recording at four levels of an instrumented tower. Intense fading occurs almost every night. A statistical study of the radioelectric and meteorological events observed, and the analysis of a specific case are presented. Author (ESA)

N83-29505# Ife Univ., Ile-Ife (Nigeria). Dept. of Physics.

STATISTICS OF RADIO REFRACTIVITY AND ATMOSPHERIC ATTENUATION IN TROPICAL CLIMATES

L. B. Kolawole *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 69-75 refs (For primary document see N83-29494 18-32)

Avail: NTIS HC A23/MF A01

The statistics of radio refractivity and atmospheric absorption of centimeter and millimeter waves in Africa are reported. Four main surface refractivity patterns are identified in line with the major climate regions of the continent. The seasonal variations of the surface refractivity are explained by a general consideration of the weather system across the continent. It is shown that the surface refractivity (Ns) and delta N, the refractivity decrease in the first kilometer height, are well correlated over Africa and from this correlation, the empirical relationship delta N = -2.30 exp (0.008630 Ns) is deduced. Author (ESA)

N83-29506# Technische Hogeschool, Eindhoven (Netherlands). Dept. of Electrical Engineering.
A COMPARISON OF RADIO WAVE AND IN SITU OBSERVATIONS OF TROPOSPHERIC TURBULENCE AND WIND VELOCITY
M. H. A. J. Herben and W. Kohsiek (Royal Netherlands Meteorological Inst.) *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 79-87 refs (For primary document see N83-29494 18-32)
Avail: NTIS HC A23/MF A01

Amplitude, phase and phase-difference scintillation measurements were performed at 30 GHz on an 8.2 km line of sight path. Temperature and humidity fluctuations and wind velocity and direction were measured midway along the propagation path. The measuring systems are described, and theory to derive the refractive-index structure parameter (C) and wind velocity (V) from radiowave scintillations and the in situ measurement is presented. Formulas are given to scale C and v with height. Author (ESA)

N83-29507# Stanford Univ., Calif.
UPPER TROPOSPHERIC STRUCTURES OBSERVED WITH VHF RADAR AT ARECIBO
A. T. Waterman and P. Czechowsky (Max-Planck Inst. fuer Aeronomie, Katlenburg-Lindau, West Germany) *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 89-94 refs (For primary document see N83-29494 18-32)
Avail: NTIS HC A23/MF A01

Clear air data from a 50 Hz radar transmitter and a 1000ft antenna are discussed. Data were taken at eight zenith angles, and two azimuths, (east and north). Received power rapidly decreases in the lower 11 km, with a much slower decrease above (up to 20 km). Marked and persistent layers are present, the two strongest being at 14 km and 17 km. Measurements of echo power vs zenith angle and estimates of Richardson's number indicate an atmospheric structure different from isotropic turbulence, thereby implying either a strong anisotropy or quasi-coherent layers. Comparison of wind measurements with the radiosonde show good agreement in magnitude but less good agreement in direction. Author (ESA)

N83-29508# Rome Univ. (Italy). Ist. di Elettronica.
AMPLITUDE SCINTILLATION IN PROPAGATION PATHS ABOVE 10 GHz
P. Basili, P. Ciotti, G. Dauria, A. Silbermann, D. Solimini (Politecnico di Milano), and E. Matricciani *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 95-101 refs (For primary document see N83-29494 18-32)
Avail: NTIS HC A23/MF A01

Data from a 35 GHz line of sight radio link over an urban area, and from the 11 and 17 GHz Earth-space path of the SIRIO propagation experiment are reported. Field amplitude distributions, covariance functions and spectral densities are given for various meteorological conditions. Significant parameters of spectra of log-amplitude fluctuations, such as cut-off frequency and asymptotic values, are discussed. For the SIRIO experiment, spectra of the sky brightness temperature fluctuations measured during the analyzed scintillation events are also reported. Author (ESA)

N83-29509# Portsmouth Polytechnic (England). Dept. of Electrical and Electronic Engineering.
AN OFFSETTING TECHNIQUE TO STUDY OSCILLATIONS IN DIRECTION OF ARRIVAL IN EARTH-SPACE PATHS
E. Vilar, P. Lo, G. Weaver, and H. Smith *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 103-110 refs (For primary document see N83-29494 18-32)
Avail: NTIS HC A23/MF A01

The technique of offsetting a high gain antenna so that fluctuations in an Earth-space path appear as fluctuations in amplitude superimposed on the usual amplitude scintillations is introduced. The technique for the data analysis and remote sensing of the turbulent path is described. Experimental results are encouraging, but the need to compare with the non offset case in order to subtract the amplitude scintillation contribution is a disadvantage. Author (ESA)

N83-29510# Forschungsinstitut der Deutschen Bundespost, Darmstadt (West Germany).
RESULTS OBTAINED FROM ATTENUATION MEASUREMENTS OF THE DEUTSCHE BUNDESPOST OTS PROPAGATION EXPERIMENT
F. Dintelmann *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 113-117 refs (For primary document see N83-29494 18-32)
Avail: NTIS HC A23/MF A01

Attenuation results from radiometer and OTS-beacon measurements at 11.6 GHz are reviewed for a 4 yr period. The average annual exceeding of attenuation, the worst-month statistics and the diurnal variation of attenuation are investigated. An average day is defined and cumulative distributions of attenuation for 8 consecutive 3 hr periods are analyzed. It is shown that during the afternoon and night the probability of exceeding specified fade levels is much higher than for the average year, but lower than for any month. Fade duration statistics are presented for a number of thresholds. For medium fade levels the distributions are very similar. Author (ESA)

N83-29511# Universite Catholique de Louvain (Belgium). Lab. de Telecommunications.
FIRST GLOBAL RESULTS OF THE EUROPEAN SPACE AGENCY OTS PROPAGATION CAMPAIGN
A. Laloux, M. VanSchingen, P. Sobieski, and G. Brussaard (ESTEC, Noordwijk, Netherlands) *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 119-125 refs (For primary document see N83-29494 18-32)
Avail: NTIS HC A23/MF A01

The OTS radiometer calibration, and analysis of attenuation and cross polarization for different frequencies and polarizations are discussed on a global statistical basis or using an event by event approach. Measured beacon attenuation is used to calibrate radiometers. Comparison of these measurements is used to determine the average sky noise temperature (Tm) in terms of attenuation. The Tm can also be derived by extracting from the cumulative distributions the calculated absorption values and measured attenuation corresponding to the same time percentages. Polarization dependence can be analyzed when Tm (linearly polarized) and both beacons (circular polarization) are available. Uplink attenuation and cross polarization can be measured by comparing the returns from two different frequencies transmitted to the satellite. Author (ESA)

N83-29512# Communications Research Centre, Ottawa (Ontario).
ATTENUATION BY RAIN ON EARTH-SPACE PATHS AT 13 GHz
R. V. Webber, J. I. Strickland, and J. J. Schlesak *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 127-133 refs (For primary document see N83-29494 18-32)
Avail: NTIS HC A23/MF A01

Rain attenuations on Earth-space paths were measured at several locations across Canada using 13 GHz radiometers. Average monthly and annual rain attenuation statistics are presented for each location. Analysis of worst month statistics shows clearly the contrasting seasonal occurrences for the various climates. It confirms that the exceeding probabilities for the average year and worst month can be related by a simple power law that is location dependent. The results show a strong dependence of rain attenuation statistics on climate and little dependence on annual accumulations of rain, number of thunderstorm days or geographic latitude. Author (ESA)

N83-29513# Universite Catholique de Louvain (Belgium). Lab. de Telecommunications et d'Hyperfrequences.
CORRELATION BETWEEN VARIOUS RADIOELECTRICAL DATA AT 11.4, 11.6, AND 35 GHz
D. Vanhoenacker, Th. Vinois, J. Meganck, S. Jespers, and A. VanderVorst *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 135-139 refs (For primary document see N83-29494 18-32)
Avail: NTIS HC A23/MF A01

Results of correlation between radioelectrical measurements made on the copolar and cross polar signals of the OTS beacon at 11.6 GHz, an 11.4 GHz radiometer in two linear polarizations, and a 35 GHz radiometer are presented. All the instruments are oriented in the same direction. Copolar versus crosspolar, copolar versus radiometry at the same frequency, crosspolar versus radiometry at the same frequency, differential radiometry at the same frequency, and radiometry 11.4 GHz versus radiometry 35 GHz correlations were studied. Fluctuations were analyzed simultaneously on the copolar signal, the crosspolar signal, the 11.4 GHz radiometer, the 35 GHz radiometer, and the differential radiometry channels. Author (ESA)

N83-29514# Khartoum Univ. (Sudan). Dept. of Electrical Engineering.

SOME X-BAND MEASUREMENTS OF THE DIELECTRIC CONSTANT OF DUST

S. M. Sharief and S. I. Ghobrial *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 143-147 refs (For primary document see N83-29494 18-32)

Avail: NTIS HC A23/MF A01

The dielectric constant of dust was measured under different conditions to determine the effects of hygroscopic water, chemical composition, and frequency. Hygroscopic water increases both real and imaginary parts of the dielectric constant. Water contents as low as 4.8% by weight cause the real part to increase by 48% and imaginary part by over 600%. Chemical analysis shows that the major constituents of dust are SiO_2, Al_2O_3 and Fe_2O_3. Of these SiO_2 is the major contributor to the real part while Al_2O_3 has the greatest effect on the imaginary part. The changes in both real and imaginary parts of the dielectric constant with frequency are small. Author (ESA)

N83-29515# University of Petroleum and Minerals, Dhahran (Saudi Arabia).

MEASUREMENTS OF THE COMPLEX REFRACTIVE INDEX OF SOILS AND AIRBORNE PARTICLES

S. J. Al-Bader and M. M. Dawoud *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 149-152 refs (For primary document see N83-29494 18-32)

Avail: NTIS HC A23/MF A01

The dielectric constant and loss tangent of soils and airborne particles in the 8 to 10 GHz band were assessed. A network analyzer measured the relative effect on the amplitude and phase of the microwave signal produced by a specimen of soil. Two parent samples were decomposed in accordance with the size of the constituent particles and the complex refractive index of each size interval measured over the frequency band. Results indicate a correlation between the size and density and the dielectric constant and loss tangent. This correlation is also observed for samples isolated by sieving when compared with airborne samples of similar density and size distribution. Author (ESA)

N83-29516# University of Technology, Baghdad (Iraq). Dept. of Electrical Engineering.

EFFECTS OF DUST/SANDSTORM ON SOME ASPECTS OF MICROWAVE PROPAGATION

Safa Haddad, M. J. Salman, and R. K. Jha *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 153-162 refs (For primary document see N83-29494 18-32)

Avail: NTIS HC A23/MF A01

The effects on microwave propagation of storm dust, simulated dust and two sand samples were investigated. Dielectric constants of the dust and sand samples at 9.35 GHz vary with moisture contents and the imaginary part increases over 100% even with 5% moisture in the samples, while rate of increase in real parts is much less. Forward scattering functions also increase with moisture. Microwave attenuation increases with particle size and concentration, and moisture, as does phase shift. Refractive indices and loss tangents increase with particle density and moisture content multipath propagations. Severe local sandstorms can incapacitate terrestrial microwave radio links, especially in summer when humidity is high. Satellite links are unaffected. Author (ESA)

N83-29517# Ministry of Posts and Telecommunications, Tokyo (Japan). Radio Research Labs.

EXPERIMENTAL STUDY OF PROPAGATION CHARACTERISTICS IN MILLIMETER WAVE REGION

Y. Furuhama, T. Manabe, T. Ihara, K. Tohma, K. Kitamura, and Y. Imai *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 165-171 refs (For primary document see N83-29494 18-32)

Avail: NTIS HC A23/MF A01

Propagation at 50.4, 81.8, 140.7, and 245.5 GHz was studied on a 810 m horizontal path. In heavy rainfall whose rate is greater than several 10 mm/hr, there is no distinctive difference among the attenuations at 81.8, 140.7, and 245.5 GHz. Attenuation at 245.5 GHz is slightly smaller than at 140.7 GHz around the peak of rainfall. The maximum variation due to fog at 245.5 GHz is 1.8 dB, corresponding under the Rayleigh approximation, to the floating liquid water content of 0.15 g/cu m. Author (ESA)

N83-29518# Ife Univ., Ile-Ife (Nigeria). Dept. of Electrical Engineering.

MEASUREMENTS AND ANALYSIS OF RAINDROP SIZE DISTRIBUTION IN SOUTH WESTERN NIGERIA

G. O. Ajayi and R. L. Olsen (Communications Research Centre, Ottawa) *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 173-184 refs Sponsored by Canadian Natural Sciences and Engineering Research Council (For primary document see N83-29494 18-32)

Avail: NTIS HC A23/MF A01

Impact distrometer data on the drop size distribution of tropical rain are presented. They show a modal type distribution which peaks at fairly large drop diameters (e.g., 2mm for rain rates above 50mm/hr) in approximate agreement with other data for tropical and subtropical locations. A fitting procedure called the moment regression modeling technique was employed with the modified gamma distribution to obtain theoretical models for the measured drop size distribution. Author (ESA)

N83-29519# Centre National d'Etudes des Telecommunications, Issy-les-Moulineaux (France).

THEORETICAL AND EXPERIMENTAL INVESTIGATION OF PROPAGATION ATTENUATION BY EQUATORIAL AND TROPICAL PRECIPITATION [ETUDE THEORIQUE ET EXPERIMENTALE DE L'AFFAIBLISSEMENT DE PROPAGATION PAR LES PRECIPITATIONS EQUATORIALES ET TROPICALES]

F. Moupfouma and J. Tiffon *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 185-192 refs In FRENCH; ENGLISH summary (For primary document see N83-29494 18-32)

Avail: NTIS HC A23/MF A01

Raindrop size distributions for equatorial and tropical climates, indirectly calculated from data collected in the Congo are presented. Predicted line of sight attenuation, derived from this distribution, is compared with experimental data collected in the Ivory Coast. Results of an experiment at 13 GHz in the Ivory Coast on a radiolink with vertical and horizontal polarizations are given. Author (ESA)

N83-29520# Wuhan Univ. (China).

RAIN RATE PROFILE EFFECTS ON RADIOWAVE ATTENUATION ABOVE 10 GHz

Z. W. Zhang, H. J. Li, and C. Q. Zhang *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 193-196 refs (For primary document see N83-29494 18-32)

Avail: NTIS HC A23/MF A01

A model of rain rate profile was developed using meteorological radar data and rain inhomogeneity characteristics, without depending on frequency. Total rainfall attenuations along an Earth-space path were calculated for 12, 20 and 30 GHz, and elevation angles 23, 45, 60 deg. Calculated and measured results agree closely. Author (ESA)

N83-29521# Research Inst. of National Defence, Linkoeping (Sweden).
STATISTICS ON THE FINE SCALE STRUCTURE OF RAIN IN STOCKHOLM, 1977-1979
L. Falk *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 197-199 refs (For primary document see N83-29494 18-32)
Avail: NTIS HC A23/MF A01

Slant path propagation and the fine scale structure of rain were studied using rain gage data. Annual, monthly and daily variations of rain rates were calculated. The spatial correlation was used to study the extension of rain cells as well as path averages connected with rain attenuation. Author (ESA)

N83-29522# Wales Univ. Inst. of Science and Technology, Cardiff.
ONE-HUNDRED GHz OPEN-RESONATOR MEASUREMENTS OF ARTIFICIAL PRECIPITATION AND FOG PROPAGATION PARAMETERS
D. J. Harris and S. Pickard *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 201-205 refs (For primary document see N83-29494 18-32)
Avail: NTIS HC A23/MF A01

An open resonator was used at 100 GHz to investigate the extinction properties of individual falling water drops and the attenuation of artificial advection fogs. Fog attenuation was also measured simultaneously at 0.63 microns wavelength. The measured extinction cross section of water drops in the 2.8 to 5.8 mm diameter range are very close to the predictions using Mie theory and the Ray model for the complex refractive index at 100 GHz. For a falling water drop with near terminal velocity, the cross section for horizontal polarization is on average 5% greater than for vertical polarization. Attenuations in fog are up to 10 dB/m at 0,63 microns and 40 dB/km at 100 GHz, the ratio of the two being 500 for most conditions. This is greater than predictions using given particle size distributions for heavy fog, but a considerable submicron particle content could explain the discrepancy. Author (ESA)

N83-29523# Centre National d'Etudes des Telecommunications, Issy-les-Moulineaux (France).
UNCERTAINTIES IN ESTIMATING WORST MONTH STATISTICS FOR EARTH-SPACE LINKS INFLUENCED BY RAIN
P. Misme and P. Waldteufel *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 209-212 refs (For primary document see N83-29494 18-32)
Avail: NTIS HC A23/MF A01

Rain attenuation for small time percentages, and its repartition over a 15 yr period were studied in order to clarify CCIR definitions concerning availability and propagation. A prediction method which computes the attenuation distribution as a function of rainfall rate distribution was used. Resulting annual distribution covers and extremes curves are very scattered. It is suggested that system specifications in agreement with CCIR recommendations can be obtained if the worst year of a 10 yr period is excluded from the statistical analysis. Author (ESA)

N83-29524# Catholic Univ., Rio de Janeiro (Brazil).
AN ANALYTICAL AND NUMERICAL COMPARISON BETWEEN TWO RAIN ATTENUATION PREDICTION METHODS FOR EARTH-SATELLITE PATHS
Emanoel Costa *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 213-218 refs (For primary document see N83-29494 18-32)
(Contract PUC-TELEBRAS-88/81)
Avail: NTIS HC A23/MF A01

It is shown that the Misme-Waldteufel integral for the prediction of rain attenuations on an Earth-satellite link can be analytically transformed and that the most important term agrees with Assis-Einloft expression to perform the same prediction. Rain attenuation values are calculated by each prediction method, assuming a large number of combinations of input parameters, in order to display the relative differences between the results. Results show that the simplicity of the Assis-Einloft method has little influence on the agreement of its predictions either with those obtained by the Misme-Waldteufel method or with experimental data. Author (ESA)

N83-29525# Alexandria Univ. (Egypt). Dept. of Electrical Engineering.
PREDICTION OF RAIN ATTENUATION BASED ON POINT RAIN RATE STATISTICS FOR ALEXANDRIA, EGYPT
Hassan N. Kheirallah *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 219-224 refs (For primary document see N83-29494 18-32)
Avail: NTIS HC A23/MF A01

Rain rate data collected over 28 yr in Alexandria are presented. Annual distributions and worst month data are compared with the CCIR distributions for the region. Corresponding attenuation statistics on hypothetical terrestrial and Earth-space links are given. These indicate that rain attenuation should not be neglected when designing microwave links operating above 10 GHz in the vicinity of Alexandria. Author (ESA)

N83-29526# Universite Catholique de Louvain (Belgium). Lab. de Telecommunications.
EVALUATION OF AN EFFECTIVE MEDIUM TEMPERATURE FROM RADIOMETRIC-SATELLITE BEACONS COMPARISONS
P. Sobieski, M. VanSchingen, A. Laloux, and G. Brussaard (ESTEC, Noordwijk, Netherlands) *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 225-231 refs (For primary document see N83-29494 18-32)
Avail: NTIS HC A23/MF A01

Radiometric calibration by OTS beacons is analyzed for the propagation data base produced by the ESA ground station and 4 fluxmeters, for the first 3 yr of the satellite. An effective medium temperature model is proposed in order to improve the prediction method of attenuation from radiometric statistics. The predictor is analyzed in terms of static error and standard deviation for the proposed model. It is shown that a global probabilistic model best improves the quality of attenuations extrapolated from radiometric data. Author (ESA)

N83-29527# Bradford Univ. (England).
CROSS POLARISATION ON TERRESTRIAL MICROWAVE LINKS DURING CLEAR WEATHER
I. A. Glover, N. J. McEwan, and P. A. Watson *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 235-238 refs (For primary document see N83-29494 18-32)
Avail: NTIS HC A23/MF A01

The importance at microwave and millimeter wavelengths of mechanisms causing cross polarization during clear weather is examined. Antenna polarization characteristics are considered. It is shown that antenna cross polarization due to anomalous clear weather propagation can be cancelled by matching transmit and receive antennas according to their polarization characteristics. For linearly polarized antennas with complete circular symmetry, identical transmit and receive antennas give complete cross polar cancellation for all plane symmetrical rays and partial cancellation for all plane asymmetrical rays. Cancellation cannot be guaranteed for rays with nonzero torsion. Author (ESA)

N83-29528# Bradford Univ. (England). Dept. of Electrical and Electronic Engineering.
INFLUENCE OF RAINDROP OSCILLATIONS ON COHERENT FORWARD SCATTERING OF MICROWAVES IN RAIN
M. Chandra, N. J. McEwan, and P. A. Watson *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 239-245 refs (For primary document see N83-29494 18-32)
Avail: NTIS HC A23/MF A01

Using a raindrop oscillation model and point matching scattering computations, the effective scattering amplitudes of oscillating raindrops for coherent forward scattering are calculated. Results are also given for raindrops with modified axial ratios deduced from radar distrometer measurements and for nonoscillating Pruppacher-Pitter (P-P) oblate raindrops. The propagation parameters relating to the coherent field of microwaves propagating

through rain are given for 11.575 and 20.0 GHz. The results for the three rain models are compared between themselves and with an empirical attenuation/cross polar discrimination level relation. The calculations reveal that oscillating P-P raindrops, relative to nonoscillating equilibrium P-P drops, are more attenuating along the horizontal and vertical polarizations, and reduce the scattering anisotropy between the two polarizations. Author (ESA)

N83-29529# Kokusai Denshin Denwa Co. Ltd., Tokyo (Japan). Transmission System Dept.

CORRELATION OF 6 AND 4 GHz RAIN-INDUCED DEPOLARIZATION AT LOW ELEVATION ANGLE

N. Matsunaka, K. Matsuzawa, H. Yuuki, and O. Furuta *In* ESA Wave Propagation and Remote Sensing Apr. 1983 247-256 refs In NEPALI (For primary document see N83-29494 18-32)

Avail: NTIS HC A23/MF A01

In order to examine uplink depolarization compensation by prediction control based on downlink information, depolarizations for up(6 GHz) and down(4 GHz) links at the elevation angle of 9 deg were measured simultaneously. There exists clear correlation between rain depolarizations in up and downlinks, both on a long-term and on an event basis. The feasibility of uplink depolarization compensation by means of the prediction from the downlink depolarization is confirmed. Data on the rate of change in rain depolarization are presented. Author (ESA)

N83-29530# Rome Univ. (Italy). Ist. di Electtronica.

EFFECTS OF THE ATMOSPHERE ON IMAGE RESOLUTION IN MICROWAVE RADIOMETRY

G. Dauria and D. Solimini *In* ESA Wave propagation and Remote Sensing Apr. 1983 p 259-267 refs (For primary document see N83-29494 18-32)

Avail: NTIS HC A23/MF A01

Effects of the atmosphere and the radiometer antenna on the attainable image resolution were analyzed. The use of a deconvolution process to improve resolution is discussed, together with errors introduced when correcting atmospheric effects. Accuracy resolution is estimated by the Backus-Gilbert approach. A tradeoff between resolution and noise suppression is sought. An interference parameter which gives the relative importances of atmospheric and surface radiation is introduced. Author (ESA)

N83-29531# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).

MESOSPHERIC WATER VAPOR MEASURED WITH AN AIRBORNE SENSOR

G. K. Hartmann, K. F. Kuenzi (Bern Univ.), and E. Lobsiger (Bern Univ.) *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 269-271 refs (For primary document see N83-29494 18-32)

Avail: NTIS HC A23/MF A01

Mesospheric water vapor distribution was measured between 30 and 80 km, using an airborne 183 GHz sensor. Data analysis shows typical volume mixing ratios below 3 ppm above 50 km with no significant maximum at the stratopause as found with ground based 22 GHz measurements. Author (ESA)

N83-29532# Helsinki Univ. of Technology, Espoo (Finland). Radio Lab.

INFLUENCE OF SURFACE TYPE ON THE BRIGHTNESS TEMPERATURE OF SNOW-COVERED TERRAIN

M. T. Hallikainen, M. C. Dobson (Kansas Univ., Lawrence), and S. Moezzi (Kansas Univ., Lawrence) *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 273-279 refs (For primary document see N83-29494 18-32)

Avail: NTIS HC A23/MF A01

The effect of surface type on the satellite-derived brightness temperature of snow covered terrain at 18 GHz and 37 GHz was investigated using digitized surface type maps of Finland. From the Nimbus-7 scanning multichannel microwave radiometer data for numerous test areas with mixed surface types, the response of each major surface type is derived. The results are compared with theoretical values using plane boundary and rough boundary brightness temperature models. Results are the same for horizontal and linear polarization. An algorithm for mapping snow water equivalents is presented. Author (ESA)

N83-29533# Rome Univ. (Italy). Ist. di Elettronica.

RADIOMETRIC SENSING OF THE ATMOSPHERIC BOUNDARY LAYER

P. Ciotti, A. Silbermann, D. Solimini, and E. R. Westwater (NOAA, Boulder, Colo.) *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 281-288 refs (For primary document see N83-29494 18-32)

Avail: NTIS HC A23/MF A01

The suitability of ground based radiometry for boundary layer observations was examined, using a 300 m instrumented tower to provide atmospheric truth. The output of an infrared radiometer at the tower base was recorded on several days, under different meteorological conditions, together with sensor data collected at the various levels of the tower. From the temporal data series, correlation is apparent between the characteristics of the radiometer output and the structure of the atmospheric boundary layer. Author (ESA)

N83-29534# West Virginia Univ., Morgantown. Dept. of Electrical Engineering.

NUMERICAL CALCULATIONS OF SPACE-HARMONIC AND FULL-WAVE SCATTERING MODELS

Donald M. DeLauder and Constantine A. Balanis *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 291-297 refs (For primary document see N83-29494 18-32)

(Contract DE-AC21-79ET-15158)

Avail: NTIS HC A23/MF A01

A space harmonic model (SHM) and a full-wave model (FWM) for scattering from corrugated rough surfaces are compared. The SHM is valid only for sinusoidal perfectly conducting surfaces, while the FWM can also be utilized for scatterers of any shape and including finite conductivity. The surfaces considered are perfectly conducting sinusoids with either vertical or horizontal polarization. Except in regions where multiple scattering is important, the FWM and SHM algorithms agree well. Computation times are discussed. Author (ESA)

N83-29535# Johns Hopkins Univ., Laurel, Md. Applied Physics Lab.

THE DEVELOPMENT AND TESTING OF A STOCHASTIC VARIATIONAL PRINCIPLE FOR ELECTROMAGNETIC SCATTERING

J. A. Krill and R. A. Farrell *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 299-307 refs (For primary document see N83-29494 18-32)

(Contract N00024-83-C-5301; Grant EY01019)

Avail: NTIS HC A23/MF A01

A vector stochastic variational principle which allows treatment of electromagnetic wave scattering from random objects or surfaces with arbitrary inhomogeneous and anisotropic permittivity, conductivity, and permeability is introduced. The method was used to test random scattering systems. Results show that the method accurately accounts for polarization effects and for interactive phenomena such as interference and multiple scattering, even with simple trial approximations that do not contain these effects. The merits of using a simple trial field are discussed with a nonstochastic example. Author (ESA)

N83-29536# Alberta Univ., Edmonton. Dept. of Electrical Engineering.

A NEW PERTURBATION EXPANSION FOR ELECTROMAGNETIC SCATTERING BY STOCHASTIC SURFACES

H. P. Baltes and A. M. J. Huiser (Ecole Polytechnique Federale, Lausanne, Switzerland) *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 309-313 refs (For primary document see N83-29494 18-32)

Avail: NTIS HC A23/MF A01

Scattering of electromagnetic waves by perfectly conducting

plane mirrors with random corrugations in the resonant region is studied. Calculation of the scattered field in a fixed configuration, and computation of the correlations in the far field of the waves scattered from an ensemble of surfaces are considered. The set of integral equations for the values of the fields and their normal derivatives on the surface of the mirror are exploited. It is shown that these equations can be solved in terms of a perturbation expansion with the corrugation height (h) as parameter. This series converges for sufficiently small h. An extension to nonperfectly conducting and dielectric mirrors is possible. The series is tested on a sinusoidal grating. Author (ESA)

N83-29537# Thessaloniki Univ. (Greece). Dept. of Electrical Engineering.

GENERALIZED APPROACH TO RADIO WAVE SCATTER FROM TIME-VARYING ROUGH SURFACES

D. P. Chrissoulidis and E. E. Kriezis *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 315-321 refs (For primary document see N83-29494 18-32)

Avail: NTIS HC A23/MF A01

A nonstationary and/or nonhomogeneous continuous and real stochastic process is used to describe the elevation of a rough surface from its mean plane. The scattering behavior of this model for surface roughness is investigated using standard scattering theories and the quasistationary approximation. The analysis considerably improves prediction of scatter from either partially developed ocean regions or fully developed lakes. Author (ESA)

N83-29538# Alexandria Univ. (Egypt). Dept. of Electrical Engineering.

MEASUREMENTS OF LONG TERM RADAR SEA CLUTTER STATISTICS

I. A. Mandour, S. E. El-Khamy, and G. I. El-Rais *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 323-331 refs (For primary document see N83-29494 18-32)

Avail: NTIS HC A23/MF A01

Daily measurements of sea clutter are presented, and the correlation between clutter amplitude and seasonal variations in sea surface conditions at four different frequencies in the X-band are discussed. The distribution of the cross correlation between clutter and wind speed as well as wave height are calculated. The probability distribution function of the clutter amplitude is deduced from the experimental data and is compared with the Rayleigh and the log normal distributions. For small clutter amplitudes, distribution follows the log normal distribution. At high amplitudes the distribution is bounded between Rayleigh and log normal, but closer to Rayleigh distribution. Author (ESA)

N83-29539# West Virginia Univ., Morgantown. Dept. of Electrical Engineering.

ART AND SIRT CORRECTION FACTORS IN GEOTOMOGRAPHY

Constantine A. Balanis, Herman W. Hill, and Kimberly A. Freeland *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 335-339 refs (For primary document see N83-29494 18-32)

(Grant NSF PRM-80-11453-02)

Avail: NTIS HC A23/MF A01

The ART and SIRT image reconstruction techniques are introduced and a correction factor which provides high resolution images is presented. The techniques were tested using synthetic measurements. In order to examine the manner in which each reconstruction progresses, the Euclidean distance for the reconstructions were plotted, versus iteration number. Results indicate that ART produces better reconstructed profiles than the SIRT (using identical correction factors). Author (ESA)

N83-29540# Ohio Univ., Athens. Dept. of Electrical and Computer Engineering.

STABILITY IMPROVEMENTS IN GEOTOMOGRAPHIC INVERSION METHODS

Roger Radcliff, Constantine A. Balanis (West Virginia Univ., Morgantown), and Herman W. Hill (West Virginia Univ., Morgantown) *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 341-346 refs (For primary document see N83-29494 18-32)

(Grant NSF PRM-80-11453-02)

Avail: NTIS HC A23/MF A01

A method to extend the usefulness and range of applicability of RF reconstructive tomography by explicitly incorporating refraction and first order reflection is proposed. Reflections are taken into account by introducing Fresnel reflection coefficients at the cell boundaries of each path, thus revising the received power. Snell's Law is adequate for tracing ray paths, However, since these paths are initially traced from a profile which ignores ray bending, significant errors can be introduced into the reconstruction. To improve the convergence problems caused by these errors, tactics of selective smoothing and path elimination were introduced. Three images were reconstructed using standard techniques and the method. Comparing the results by the Euclidean distance error measure with boundary definition by minimum variance partitioning, shows a marked improvement in every case for the method. Author (ESA)

N83-29541# Universite Catholique de Louvain (Belgium). Lab. de Telecommunications.

COMPARISON OF TWO METHODS FOR ESTIMATING THE WATER VAPOR CORRECTION TO ALTIMETER READINGS FROM RADIOMETRIC MEASUREMENTS

Albert Guissard *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 347-354 refs (For primary document see N83-29494 18-32)

(Contract ESTEC-4702/81)

Avail: NTIS HC A23/MF A01

Ground and space based methods for extracting the wet path length correction to altimeter range measurements from a two frequency radiometer are described. Both instruments are on board the same spacecraft and the wind speed is assumed to be known to within + or - 2 m/sec from the altimeter readings. Performance was compared by a simulation analysis of 1080 cases. The extended spaceborne method works the best, giving a maximum standard deviation of 1.8 cm for the wet path length.Author (ESA)

N83-29542# Clarkson Coll. of Technology, Potsdam, N.Y. Dept. of Electrical and Computer Engineering.

SCATTERING AND ABSORPTION BY ATMOSPHERIC AEROSOL MODELS

P. W. Barber and P. E. Geller *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 357-362 refs (For primary document see N83-29494 18-32)

Avail: NTIS HC A23/MF A01

The T-matrix method is used to calculate the electromagnetic scattering by prolate spheroidal particles in fixed orientation and randomly oriented in 3-D. The method can also be used for oblate spheroidal particles. The size and refractive index of the spheroids can be selected to model atmospheric particulates at wavelengths of interest. The depolarization of a plane wave which occurs upon interaction with a system of nonspherical particles is discussed. The physical features of a particle are related to the polarized scattering by a parameterization of both particle shape and the elements of the Mueller matrix. The method can be used to deduce particle characteristics from the measured polarized scattering dependence. Author (ESA)

N83-29543# European Space Research and Technology Center, Noordwijk (Netherlands).

BACKSCATTERING AND DIFFERENTIAL BACKSCATTERING CHARACTERISTICS OF THE MELTING LAYER

A. W. Dissanayake, M. Chandra (Bradford Univ., England), and P. A. Watson (Bradford Univ., England) *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 363-370 refs (For primary document see N83-29494 18-32)

Avail: NTIS HC A23/MF A01

A model for the radar bright band is presented to characterize the anisotropy observed by dual polarized radars. Constituent particles in the melting layer are considered to be oblate spheroids with eccentricity equal to corresponding melted

rain drops except that the axial ratio of smaller particles has a maximum value of 0.9. Partially melted particles were considered as two layered objects and their backscattering cross sections were evaluated using the T-matrix method. Model predictions compared with dual polarized radar measurements show fairly good agreement. Author (ESA)

N83-29544# European Space Research and Technology Center, Noordwijk (Netherlands).
RADIATIVE TRANSFER IN SIZE-LIMITED BODIES
G. Brussaard *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 371-377 refs (For primary document see N83-29494 18-32)
Avail: NTIS HC A23/MF A01

Discrepancies between attenuation values predicted by radiometers and those measured using satellite beacons, were studied, using radiation from raincells of various sizes and shapes. It is shown that errors caused by scattering are much larger for a raincell occurring on the path and away from the radiometer site than in a stratified rain medium of infinite horizontal extent. The accuracy obtainable for radiometric measurements in the 20 and 30 GHz band is shown to be severely limited by scatter effects. The effective medium temperature to be used in the classical radiometer equation is a function of spatial characteristics of the rain medium. Author (ESA)

N83-29545# Royal Norwegian Council for Scientific and Industrial Research, Kjeller. Environmental Surveillance Technology Program.
ON THE USE OF COMMUNICATION CONCEPTS AND TECHNIQUES FOR REMOTE SENSING
Jens Hjelmstad *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 381-390 refs (For primary document see N83-29494 18-32)
Avail: NTIS HC A23/MF A01

A radar target with a longitudinal distribution of scatterers is described in terms of its equivalent multipath communication channel. Parameters in the radar target signatures are related to the measured quantities in communication channel measurements systems. It is shown that the frequency dependency of the intermodulation in the frequency division multiplexing system reveals the multipath structure (target signature) in the same way as can be observed by a multifrequency radar for radar targets. Author (ESA)

N83-29546# Centro Studi e Laboratori Telecomunicazioni, Turin (Italy).
PROPAGATION CHARACTERISTICS AT 35 AND 78 GHz FOR SPACEBORNE ALTIMETERS
D. Tarducci *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 391-398 refs (For primary document see N83-29494 18-32)
(Contract ESTEC-4535)
Avail: NTIS HC A23/MF A01

Atmospheric effects on Earth-satellite radar altimeter links were investigated. Clear air effects due to oxygen and water vapor contributions to the refractive index of the medium were examined. Coherent effects on the statistically averaged field (attenuation, phase rotation and in-band distorsions of the radar pulse); radar reflectivity contributions to the received field; and scintillation effects due to particle random motion were studied. For each of these phenomena computations were carried out for ice and water cloud particles concentrations and for rain at different rates. Results show that range errors decrease with increasing frequency from 35 to 78 GHz. Doppler effects are negligible. As far as propagation is concerned, the 78 GHz band is particularly suitable for spaceborne radar altimeter applications. Author (ESA)

N83-29547# Ruhr Univ., Bochum (West Germany). Ist. fuer Hoch- und Hoechstfrequenztechnik.
ON ELECTROMAGNETIC METHODS IN GEOPHYSICAL PROBING
Volkert Hansen *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 399-404 refs (For primary document see N83-29494 18-32)
Avail: NTIS HC A23/MF A01

A method for determining the radiation properties of wire antennas on a stratified structure is described. For the current on the wire an integral equation is formulated using the Green's function of the structure. The complete set of equations for the Green's function are solved, including the effect of surface and leaky waves. The integral equation is solved by the method of moments. Inferred from the current and input impedance, the mutual coupling of two antennas and the field in the layers are interpretated in terms of the structure parameters. Author (ESA)

N83-29548# Universite des Sciences et Techniques de Lille (France).
RESPONSE OF A LAYER TO SINUSOIDAL OR IMPULSIVE ELECTROMAGNETIC EXCITATION: APPROXIMATION OF THE THIN PLATE [RESPONSE D'UN GISEMENT A UNE EXCITATION ELECTROMAGNETIQUE SINUSOIDALE OU IMPULSIONNELLE: APPROXIMATION DE LA PLAQUE MINCE]
P. Degauque, Q. T. Nguyen, and M. Cauterman *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 405-410 refs In FRENCH; ENGLISH summary (For primary document see N83-29494 18-32)
Avail: NTIS HC A23/MF A01

Three dimensional numerical methods were used to simulate the response of a layer to the excitation from an antenna on the ground surface. The layer response to an impulsive wave was studied, including possible variation of the conductivity with frequency. The simplification that might result in the computations from assimilating the layer to an inclined thin plate with larger conductivity than the embedding medium is discussed. Analysis shows that the model can only be used for homogeneous or horizontally stratified media, where the analytical solution of the field radiated by a dipole is known. Author (ESA)

N83-29549# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
CAPABILITY OF SURFACE-BASED CLEAR-AIR DOPPLER RADAR FOR MONITORING METEOROLOGICAL PROPERTIES IN ELEVATED LAYERS
Earl E. Gossard (Colorado Univ., Boulder), Russel B. Chadwick, Thomas Detman, and John Gaynor *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 413-424 refs (For primary document see N83-29494 18-32)
Avail: NTIS HC A23/MF A01

Turbulent and mean atmospheric quantities were measured on a 300 m meteorological tower in order to evaluate hypotheses for simplifying the kinetic energy balance and refractive index variance equations. Some FM-CW radar measurements of Doppler spectral width were also made for comparison with tower-measured velocity spectra. Height distributions of the turbulent dissipation rate within stable layers are shown and viscous cutoff radar wavelengths are calculated. Radar and tower measurements agree well, but the effects of wind direction and the other meteorological parameters on the results are unclear. Author (ESA)

N83-29550# Essex Univ., Colchester (England). Dept. of Electrical Engineering Science.
THE DEPENDENCY ON THE PROPAGATION ENVIRONMENT OF THE FREQUENCY SCALING OF ATTENUATION
R. McGuiness, A. R. Holt, and B. G. Evans *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 425-436 refs (For primary document see N83-29494 18-32)
(Contract SRC-N2B-2R-0338)
Avail: NTIS HC A23/MF A01

Attenuation ratios on slant paths through rain were obtained using a dual polarization radar database. Results for circular polarization for 14.455/11.786 GHz, 17.5/11.786 GHz, 30.0/20.0 GHz, together with estimates of the effect of the melting band are presented. Results for differential (linear) attenuation are given. Results show that the attenuation ratio for two frequencies propagating through rain depends on the type of the rain, the

ratios being greater in light rain than in heavy rain. It is shown that this is not a defect in the model, but a real effect.
Author (ESA)

N83-29551*# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
RADAR MODELING OF SPACE DIVERSITY ASSOCIATED WITH SLANT PATH RAIN ATTENUATION AT VARIABLE PATH ANGLES, FREQUENCIES, AND DROP SIZE DISTRIBUTIONS
Julius Goldhirsh *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 437-445 refs (For primary document see N83-29494 18-32)
(NASA Order S-50748-A)
Avail: NTIS HC A23/MF A01 CSCL 20N

Single and joint terminal slant path attenuation statistics at frequencies of 28.56 and 19.04 GHz were derived from radar data. Statistics were independently obtained for path angles of 20, 45, and 90 deg, in order to examine how path angle influences both single terminal and joint probability distributions. A prediction technique is demonstrated to work well for calculating both single and joint terminal distributions at other path angles. Diversity gains and autocorrelation function dependence on site spacing were determined employing the radar modeling results. Author (ESA)

N83-29552# Politecnico di Milano (Italy). Dept. di Elettronica.
SITE DIVERSITY IN EARTH TO SATELLITE LINKS: RADAR MEASUREMENTS AND THEORETICAL PREDICTIONS
C. Capsoni, J. P. V. PoiaresBaptista, and E. Matricciani *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 447-454 refs (For primary document see N83-29494 18-32)
Avail: NTIS HC A23/MF A01

The statistical performance of a site diversity system at 11.6 GHz for Earth to satellite radio links experiencing rain attenuation is summarized. The site diversity system is simulated using radar data calibrated against the satellite Sirio beacon signal received at the radar site. The diversity system is simulated by a statistical model which employs raingage data and information on the structure of rain derived from radar. It is shown that these predictions agree well with the true radar simulated diversity data.
Author (ESA)

N83-29553# National Research Council of Canada, Ottawa (Ontario). Div. of Electrical Engineering.
ATTENUATION OF RADIO WAVES BY ATMOSPHERIC WET ICE AND MIXED PHASED HYDROMETEORS
Y. M. M. Antar and A. Hendry *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 455-461 refs (For primary document see N83-29494 18-32)
Avail: NTIS HC A23/MF A01

Radio attenuation by wet ice, mixed phase hydrometeors, snow flakes in the melting region during stratiform precipitation, wet snow flakes during a snow storm, and by hail on an Earth-space path was studied. Polarization diversity radar measurements at 16.5 GHz along with satellite beacon attenuation measurements at 28.56 GHz are presented. Results indicate that wet snow and hail cause significant attenuation. Melting layer particles produce attenuation which is much larger than that due to rain of the same reflectivity. Large wet snow aggregates at ground level also produce substantial attenuation. The high levels of attenuation due to hail are demonstrated. Author (ESA)

N83-29554# Politecnico di Milano (Italy). Dept. di Elettronica.
ASSESSMENT OF THE INTRINSIC RAIN PROFILE PARAMETERS FROM RADAR AND RAINGAUGE DATA
C. Capsoni, G. Macchiarella, M. Mauri, and A. Paraboni *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 463-468 refs Sponsored by Ugo Bordoni Foundation (For primary document see N83-29494 18-32)
Avail: NTIS HC A23/MF A01

Statistics on intrinsic rain profile parameters are given. Rain profile related information needed for evaluating path integrated parameters such as link attenuation, and anisotropy is contained. Applications in attenuation prediction methods, short-term frequency scaling and modeling of rain structures are discussed. The single and bidimensional statistics are all of conditioned type in order to link them to a second variable (such as point rain-intensity or attenuation) the long-term statistic of which is well known for the locality of interest. Author (ESA)

N83-29555# Lowell Univ., Mass. Center for Atmospheric Research.
SYMMETRIC FOUR ANTENNA ARRAY RESOLVES MULTIPLE REFLECTORS WITH COMPLEX SPECTRUM ANALYSIS OF MULTIPLEXED CLOSELY SPACED FREQUENCY SOUNDINGS
K. Bibl *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 469-474 refs (For primary document see N83-29494 18-32)
(Contract F19628-80-C-0064)
Avail: NTIS HC A23/MF A01

Methods to find the reflection points as a function of Doppler frequency for the complex spectrum analyzed data of the Digisonde were developed. Analytical solutions for single source location and two source separation at each Doppler frequency, measured with symmetric four antenna arrays, are presented. Coherent pulse sounding with electromagnetic or acoustical waves can determine the shape and motion of a smooth two dimensionally curved surface or of randomly distributed reflectors. Spectral signature results for combined models, moving with independent velocities, are discussed. Author (ESA)

N83-29556# National Telecommunications and Information Administration, Boulder, Colo. Inst. for Telecommunication Sciences.
EXPERIMENTAL AND ANALYTICAL ASPECTS OF ATMOSPHERIC EHF REFRACTIVITY
Hans J. Liebe and Donald H. Layton *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 477-486 refs (For primary document see N83-29494 18-32)
(Contract ARO-101-83)
Avail: NTIS HC A23/MF A01

Absolute attenuation rates and refractivities due to water vapor and moist nitrogen were measured in the laboratory at 138 GHz, 300 K, pressures up to 1.5 atm, and relative humidities up to 100%. The computer-controlled measuring system comprises a millimeter wave resonance spectrometer (0.15 km effective path length) and a humidity simulator. The data are interpreted as a water vapor continuum spectrum consisting of two terms: strong self broadening (H2O-H2O) plus foreign gas broadening (H2O-N2) contributions. Implications of the results for modeling atmospheric EHF window transparencies and for revising established H2O line broadening theory are discussed. Author (ESA)

N83-29557# Academy of Sciences of the Ukrainian SSR, Kharkov (USSR). Inst. of Radiophysics and Electronics.
EFFECT OF LARGE-SCALE ANISOTROPIC REFRACTIVE INDEX INHOMOGENEITIES ON THE STRENGTH OF THE COHERENT VHF SIGNAL COMPONENT BEYOND THE HORIZON
A. V. Kukushkin, V. D. Freulicher, and I. M. Fuchs *In* ESA Wave Propagation and Remote Sensing Apr. 1983 p 487-493 refs (For primary document see N83-29494 18-32)
Avail: NTIS HC A23/MF A01

The propagation of microwaves through a nonuniform troposphere with anisotropic random inhomogeneities of the refractive index, characterized by horizontal scale lengths of several hundred meters, is shown to be reducible to the problem of wave propagation through a random stratified medium. The effect of this random stratification upon the field in the near transhorizon region, i.e., 100 to 200 km from the transmitter, is estimated. Expressions for the field moments are obtained, which explain the greater fading depths which accompany a growth in the coherent component. The average intensity of the signal grows with the rms fluctuations in the refractive index, even if the average gradient is too small to produce enhanced refraction. Author (ESA)

N83-29558# Army Armament Research and Development Command, Aberdeen Proving Ground, Md. Chemical Systems Lab.

SCATTERING BY SPHEROIDAL AND ROUGH PARTICLES
Donald W. Schuerman and Ru T. Wang Dec. 1982 93 p
(DA Proj. 1L1-61102-A-71A)
(AD-A125767; ARCSL-CR-82037) Avail: NTIS HC A05/MF A01 CSCL 20/6

We live in a world rich in the phenomena of electromagnetic scattering; the blue of the sky, the wonderful colors of colloidal suspensions, rainbows, and, indeed, almost every visual experience is the result of scattering. Curious and analytical minds have been attracted to the scientific explanation of these phenomena in terms of the physical processes involved. This effort, which has been continued from ancient times, has evolved into light scattering studies of academic as well as practical interests. Gradually, it was realized that under most circumstances the total scattered light and also the observed polarization could be estimated from the simple sum of the scattered light from the individual particles in a given medium. This is the so-called single-particle scattering approach. Furthermore, each single scattering was found to be completely determined by the particle size in comparison with the wavelength of the incident wave, its shape, its index of refraction, and the particle orientation with respect to the incident polarization. GRA

N83-29559# Massachusetts Inst. of Tech., Cambridge. Spectroscopy Lab.
EXPLORATION OF NEW METHODS TO PRODUCE EFFICIENT SOURCES OF COHERENT NEAR MILLIMETER WAVE RADIATION Final Report, 1 Aug. 1981 - 30 Sep. 1982
Michael S. Feld, Ramachandra R. Dasari, and John F. Thomas 11 Feb. 1983 8 p
(Contract DAAG29-81-K-0158)
(AD-A125772; ARO-18671.2-PH) Avail: NTIS HC A02/MF A01 CSCL 20/14

A new idea is proposed for generating intense near millimeter wave (NMMW) radiation based on photon recycling in a two temperature system. In this method heat is converted into NMMW energy using infrared photons as a catalyst. Infrared-infrared double resonance spectroscopy is applied to study energy storage and collisional transfer in molecules which are candidates for photon recycling schemes. Author (GRA)

N83-29560# Harry Diamond Labs., Adelphi, Md.
DESIGN-DEPENDENT VARIABILITY OF PULSE HARDNESS OF TYPES OF DISCRETE SEMICONDUCTOR DEVICES (INTERVENDOR VARIATIONS)
Bruno M. Kalab Dec. 1982 56 p refs
(AD-A125776; HDL-TR-1999) Avail: NTIS HC A04/MF A01 CSCL 18/6

The differences in the pulse hardness of several types of low power transistors due to different designs of each type were investigated. The pulse hardness is characterized by the power of a 1us square pulse of voltage necessary and sufficient to cause failure or second breakdown in a reverse biased junction. This power was determined by the process of step stressing for both the emitter to base and collector to base junctions. In one commercial type, the failure power of the collector to base junctions varied by more than four orders magnitude, and the failure power of the emitter to base junctions varied by more than two orders of magnitude. In two of the JAN types, a range of specimen failure powers of the collector to base junctions of more than three orders of magnitude was found; in one type, the mean values of samples varied by about a factor of 50. The variation of the failure powers of the emitter to base junctions in the JAN investigated was negligible. Design dependent variations of the failure levels of specimens of one type are thus possible that are orders of a magnitude larger than previously thought. GRA

N83-29561# Kansas Univ. Center for Research, Inc., Lawrence. Remote Sensing Lab.
HELICOPTER-BORNE SCATTEROMETER
R. G. Onstott, R. K. Moore, S. P. Gogineni, Y. S. Kim, and D. E. Bushnell Oct. 1982 113 p refs
(Contract N00014-76-C-1105)
(AD-A125796; CRINC/RSL-TR-331-24) Avail: NTIS HC A06/MF A01 CSCL 17/9

The purpose of this report is to provide a detailed technical description of the University of Kansas helicopter-borne microwave active spectrometer (HELOSCAT). A major advantage of this calibrated system is the mobility of the helicopter platform; it has the advantages of both a ground-based system and an aircraft system without many of the inherent disadvantages. The Bell 206 helicopter was chosen as the best platform because of its wide availability in the High Arctic (and continental U.S., for that matter) and its low operating cost when compared to its sister aircraft, the Bell 205 and 212. Costs are in the range of $350/flight hour with a fuel consumption of 30 gallons per hour. In contrast, the larger Bell 205 costs are $1000/hour with a fuel consumption of 80 gallons per hour. This system features the ability to acquire data at frequencies from 4 to 18 GHz with like-and cross-antenna polarizations and angles of incidence from 10 degrees to 70 degrees. All control, including that of the angles and antenna polarizations, is from within the aircraft. Frequency selection may be performed both manually or via microprocessor. The microprocessor also multiplexes data from a fast true rms detector (0.1 second average) and an averaging true rms detector (1 second average). Author (GRA)

N83-29562# Virginia Univ., Charlottesville. Dept. of Electrical Engineering.
MULTIACCESS OF A SLOTTED CHANNEL USING A CONTROL MINI-SLOT
Dimitri Kazakos Dec. 1982 37 p refs
(Grant AF-AFOSR-0030-82; AF Proj. 2304)
(AD-A125569; UVA-525634/EE82/106; AFOSR-83-0109TR) Avail: NTIS HC A03/MF A01 CSCL 12/1

The multiaccess problem as characterized by an infinite user population and a time-slotted channel using a control mini-slot is examined. The input rate stability region of the proposed algorithm is determined and compared to the random access algorithm with the greatest known efficiency for the Poisson multiple access model without additional information. A break-even point is given. Author (GRA)

N83-29563# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
SATNET DEVELOPMENT AND OPERATION, PLURIBUS SATELLITE IMP DEVELOPMENT, INTERNET OPERATIONS AND MAINTENANCE, MOBILE ACCESS TERMINAL NETWORK Combined Quarterly Technical Report, 1 Nov. 1982 - 31 Jan. 1983
J. F. Haverty Feb. 1983 56 p
(Contracts MDA903-80-C-0353; N00039-81-C-0408; ARPA Order 3214)
(AD-A125959; QTR-28) Avail: NTIS HC A04/MF A01 CSCL 17/2

This quarterly technical report describes work on the development of an experimentation with packet broadcast by satellite; on development of Pluribis Satellite IMPs; on Internetwork monitoring; and on shipboard satellite communications. Author (GRA)

N83-29564# Lincoln Lab., Mass. Inst. of Tech., Lexington. Group 92.
A NOTE ON BEAMFORMING ALGORITHMS
William H. Schoendorf 12 Jan. 1983 19 p refs
(Contract F19628-80-C-0002; AF Proj. 627A)
(AD-A126275; ESD-TR-82-156; TR-631) Avail: NTIS HC A02/MF A01 CSCL 09/5

Two procedures for specifying element weightings for antenna arrays are described. The first procedure is used for gain optimization and the second for shaping the array gain pattern. Applications of these procedures including beamwidth and sidelobe reduction are included. Author (GRA)

N83-29565# Army Missile Command, Redstone Arsenal, Ala. Advanced Sensors Directorate.
DETECTION CRITERIA FOR A RADAR USING COINCIDENCE PROCESSING

Robert Boothe 18 Aug. 1982 13 p refs
(AD-A126131; AD-E950363; DRSMI-RE-82-20-TR) Avail: NTIS HC A02/MF A01 CSCL 17/9

A detection process requiring a coincidence of two events (range-Doppler channel threshold crossings) for target detection is examined. The detection parameters examined include the average false alarm time, probability of false alarm, and detectability factor for a fluctuating target. A loss, termed coincidence detection loss, is also presented. Author (GRA)

N83-29566# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A FDM MASTER-GROUP SIGNAL ENCODING EQUIPMENT
Li Mingjiu and Jian Yushen 10 Feb. 1983 23 p refs Transl. into ENGLISH from Tongxin Xuebao (China), no. 2, Apr. 1981 p 26-35
(AD-A126158; FTD-ID(RS)T-1691-82) Avail: NTIS HC A02/MF A01 CSCL 09/5

An introduction to the techniques used in carrier wave signal encoding equipment is provided. This device converts a 300 channel 60 to 1300 kHz carrier wave signal to a 34368 kb/s digital signal which is transmitted over a third order group transmission system. On the basis of the noise requirements the description of the level allocation and number of bits for encoding the encoder is emphasized. The selection of parameters, such as the sampling frequency and the output code pattern of the encoder is discussed. The composition of the device and the testing results are also introduced. GRA

N83-29567# Environmental Research Inst. of Michigan, Ann Arbor. Radar and Optics Div.
THE USE OF SYNTHETIC APERTURE RADAR TO DETECT AND CHART SUBMERGED NAVIGATION HAZARDS Final Report, Apr. 1981 - Apr. 1982
Eric A. Kasischke, David R. Lyzenga, R. A. Shcuhman, Y. S. Tsen, Barbara S. Termaat, Barbara A. Burns, and Guy A. Meadows Apr. 1982 236 p refs
(Contract N00014-81-C-2254)
(AD-A126071; ERIM-155200-1-F) Avail: NTIS HC A11/MF A01 CSCL 17/9

This report discusses the utility of synthetic aperture radar (SAR) data collected by the SEASAT satellite for the detection and charting of bottom features which might be hazardous to navigation. Data from 35 SEASAT orbits were used to examine nine test sites. These test sites included: the Tongue of the Ocean, Bermuda, Haiti, Sula Sgier, Cook Inlet (Alaska), the Mississippi River Delta, the English Channel, the Nantucket Shoals, and the northeast Atlantic Ocean. The northeast Atlantic test site actually contained 17 distinct bottom features such as seamounts, submarine ridges, banks and the edges of continental shelfs. Three distinct techniques were used to examine the SEASAT SAR imagery: broad survey studies, multi-temporal analyses, and multisensor analyses. This study continued to document the utility of SEASAT SAR imagery for locating and identifying bottom features in both shallow and deep water portions of the world's oceans. By correlating the SAR data with ancillary environmental data (such as wind, wave, and tidal current information) the causes of many of the bottom-related surface patterns on the SAR imagery have been identified, an important step for defining the limitations of SAR data for bottom feature detection. GRA

N83-29568# Naval Research Lab., Washington, D. C. Communication Systems Engineering Branch.
VOICE-COMMUNICATION TESTING USING NAIVE AND EXPERIENCED COMMUNICATORS Interim Report
Astrid Schmidt-Nielsen 3 Feb. 1983 17 p refs
(RR0210542)
(AD-A126109; AD-E000533; NRL-8655) Avail: NTIS HC A02/MF A01 CSCL 17/2

Subjects with and without communication experience evaluated a variety of digital voice processors with data rates from 800 to 32,000 bits per second. Two conversational tests were used: one with a restricted vocabulary and one with an open vocabulary. Ratings of the voice processors were similar in all conditions, but the experienced communicators used more compensatory behaviors when talking over the poor voice systems. The inexperienced communicators developed similar compensations but used them less often. The results suggest that ratings by the subjects are reliable measures of the performance of voice processors. Objective measures of talking performance are less reliable but show the same trends. Because the experienced subjects were more tolerant of degradation, the ratings did not discriminate among systems as well as those of the inexperienced subjects. However, both groups showed more errors and longer test times with more degraded systems. Thus the best possible system should be chosen even for experienced users, but the choice may better be made with ratings by inexperienced test subjects, and the testing technique need not necessarily closely resemble the real-world application. GRA

N83-29569# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
CONTINUED DEVELOPMENT OF THE UNIVERSAL NETWORK INTERFACE DEVICE M.S. Thesis
Gennaro Cuomo Dec. 1982 113 p refs
(AD-A126031; AFIT/GE/EE/82D-28) Avail: NTIS HC A06/MF A01 CSCL 09/2

The objective of this investigation was to design and construct two memory boards for the digital engineering laboratory network's (DELNET's) universal network interface devices (UNID). The UNID is a flexible message processor designed for computer communications network applications. The new memory boards incorporated the prototype microcomputer based message processor memory boards of the previous theses. Using the existing memory boards, new memory boards were designed, constructed, tested, and documented. The results of this effort were the elimination of unreliable random access memory (RAM) the reduction in the number of circuit boards used in the UNID, and two operational UNID. Author (GRA)

N83-29570# Naval Weapons Center, China Lake, Calif. Research Dept.
REACTIVELY STEERED ADAPTIVE ARRAY USING MICROSTRIP PATCH ELEMENTS AT 4 GIGAHERTZ Interim Report
R. J. Dinger Feb. 1983 38 p refs
(AD-A126298; NWC-TP-6421) Avail: NTIS HC A03/MF A01 CSCL 09/5

A reactively steered adaptive array (RESAA) has one element connected by a transmission line to a receiver and a number of closely spaced parasitic elements, each of which is terminated by an adjustable reactive load. The pattern is formed by adaptive control of the reactive loads. A five element linear RESAA fabricated from microstrip patch antennas was evaluated at 4.0 GHz. Manual adaptive control was used to form a pattern with a minimum in the direction of an interference signal. A minimum could always be formed in the direction of the interference that had a depth (relative to the pattern maximum) of 30 dB and a width of 25 degrees. The theory of the array was developed using an N-port network formalism, and simulations with this theory reproduced the essential features of the experimental measurements. The potential advantages of a RESAA, as compared with a conventional adaptive array, include the elimination of the mixers and other hardware needed to perform the complex weighting of the output of each element at an intermediate frequency, greater dynamic range, and smaller overall size. Author (GRA)

N83-29571# Ohio State Univ., Columbus. Electroscience Lab.
ANGLE OF ARRIVAL ESTIMATION Interim Report, Apr. 1980 - Apr. 1981
Bengt V. Andersson Griffiss AFB, N.Y. RADC Dec. 1982 72 p refs
(Contract F30602-79-C-0068; AF Proj. 4519)
(AD-A126038; RADC-TR-82-250; ESL-711679-4) Avail: NTIS HC A04/MF A01 CSCL 17/2

The objective of this study was to develop methods of

determining the angle of arrival of uplink signals in a Time Division Multiple Access (TDMA) Satellite Communications System that employs high gain, switchable downlink spotbeams. Two approaches are examined and data resulting from theoretical calculations and computer simulations are presented from comparison. Both approaches are based upon maximum likelihood estimation and incorporate adaptive array processing in suppressing undesired signals. The results show that either approach can accurately determine the angle of arrival of a desired signal in the presence of much higher powered undesired signals. In future TDMA SATCOM Systems, the angle of arrival data could be provided to expanded on-board processors to steer the switchable, downlink spotbeams. Author (GRA)

N83-29572# ARO, Inc., Arnold Air Force Station, Tenn.
PRESSURE ALTITUDE TESTS OF THE ARMY AN/MSQ-114 CONTROL TERMINAL Final Report, 27 Aug. - 27 Oct. 1982
Judy C. Bergmann AEDC Dec. 1982 19 p refs
(AD-A125524; AEDC-TSR-82-P39) Avail: NTIS HC A02/MF A01 CSCL 14/2

The Army AN/MSQ-114 Control Terminal was tested to determine the effects of 40,000 ft and 10,000 ft pressure altitudes on the transportability and operability, respectively, of the electronic equipment inside the terminal. During the operational test phase (10,000 ft) of the first tunnel entry, a problem developed with the electronic equipment and testing was terminated. The equipment was subsequently modified and tested successfully during a second entry. Author (GRA)

N83-29573# University of Southern California, Marina del Rey. Inst. for Information Sciences.
COMMUNICATION ENVIRONMENTS FOR LOCAL NETWORKS Ph.D. Thesis
Paul V. Mockapetris Dec. 1982 198 p refs
(Contract MDA903-81-C-0335)
(AD-A125441; ISI/RR-82-103) Avail: NTIS HC A09/MF A01 CSCL 17/2

This report studies the problem of providing high performance communication services to computers on a local network, or other high-speed network, without sacrificing compatibility with existing communication protocols. The focus of the investigation is the network interface, the I/O controller which interfaces computers to the network medium. The network interface proposed in this report contains a novel processing element called the filter, in addition to a fairly common microprocessor based architecture. The filter is a high-speed custom processor and a memory which holds programmable descriptions of packet formats and connection records for the protocols supported by the interface. The filter could be implemented using VLSI or a small amount of readily available bit-slice components. The filter enables the interface to process most transmissions as they arrive on the communications medium. Filter processing adds negligible delay to the overall communication path and, in most cases, replaces processing which is conventionally performed in the software of the interface microprocessor or the host. Thus, communications systems built with the new interface are limited by the speed of the medium and not by processing delays. The filter interface is shown to be practical for a 10 Mbps medium and several protocols, including the Internet Protocol (IP) and the Transmission Control Protocol (TCP). Author (GRA)

N83-29574# Naval Underwater Systems Center, New London, Conn. Submarine Electromagnetic Systems Dept.
ELF PVS FIELD STRENGTH MEASUREMENTS, APRIL 1977
Peter R. Bannister 3 Feb. 1983 63 p refs
(AD-A126212; NUSC-TR-6771) Avail: NTIS HC A04/MF A01 CSCL 17/2

From September 1976 to December 1978, extremely low frequency (ELF) field-strength and effective-noise measurements were taken aboard operational submarines. The results of measurements taken in Connecticut and aboard a submarine located under the ice in the Greenland Sea area during April 1977 are discussed. The principal result is that the average daytime and nighttime field strengths measured aboard the submarine are in excellent agreement with previous ELF measurements taken over similar paths. As expected, the presence of the ice cap had no adverse effect on ELF reception. Author (GRA)

N83-29575# Rockwell International Corp., Thousand Oaks, Calif. Microelectronics Research and Development Center.
INTEGRATED OPTICAL TRANSMITTER AND RECEIVER Final Technical Report, 18 Sep. 1980 - 31 Dec. 1981
M. E. Kim Feb. 1983 101 p refs
(Contract N00173-80-C-0485; DARPA Order 4036)
(AD-A125493; MRDC41081.9FR) Avail: NTIS HC A06/MF A01 CSCL 17/2

This document reports the results of a one-year program, based on a technical proposal submitted to and accepted by DARPA, to develop a technology for realizing a GaAlAs/GaAs monolithic integrated optoelectronic transmitter for high-speed fiber-optic communications applications. The primary objectives were to: (1) determine a suitable approach for integrating optical and electronic devices in terms of compatible device processing and fabrication, (2) design a simplified high-speed transmitter based on the integration approach which will serve as a building block for future more sophisticated designs, (3) develop the transmitter materials technology, (4) develop the transmitter device components, and (5) fabricate and demonstrate the integrated transmitter. At the end of the programs, all of the objectives were realized except for the demonstration of a functional transmitter. A selective epitaxial growth technique using a dielectric mask was developed for process/fabrication compatibility of the laser with planar ion-implanted GaAs electronic devices with 1 micron-type geometries. Based on this integration approach, a nominal 1-4 Gb/s transmitter set utilizing standard cleaved mirror lasers and field-effect transistor (FET)/Gunn logic drivers was designed, process/fabrication steps defined, and a fabrication mask set generated. Author (GRA)

N83-29576# Duke Univ., Durham, N. C. Dept. of Physics.
THE GENERATION OF NEAR MILLIMETER RADIATION BY PICOSECOND PULSE DEMODULATION Final Report, 1 Aug. 1979 - 1 Oct. 1982
Frank C. DeLucia Jan. 1983 67 p
(Contract DAAK70-79-C-0121)
(AD-A125510) Avail: NTIS HC A04/MF A01 CSCL 17/9

Near Millimeter Waves can be generated by the demodulation of a picosecond optical pulse train by a photocathodes. Power is produced by the interaction of a microwave structure and the beam of prebunched electrons produced by the demodulation. These bunched electrons are produced at a photocathode by a picosecond optical pulse train. The separation of the bunching process from the energy extraction interaction introduces substantial flexibility into the design of devices based upon this concept. Perhaps the most important manifestation of this flexibility is the capability of these devices to provide virtually any waveform and pulse sequence desired with complete pulse to pulse phase coherence and rapid, controlled frequency agility. Furthermore, techniques are discussed that can change this coding at speeds governed only by electrooptic time scales. It is also important to note that these devices are not quantum down convertors (which would be limited by Manley-Rowe considerations to a maximum efficiency of approximately 0.1%) but rather 'classical' devices in which gain phenomena can convert DC power to microwave energy, thus providing orders of magnitude more efficiency. In this report and its appendixes, we discuss the basic physics of picosecond demodulation devices, experimental results and systems based upon these concepts. Author (GRA)

N83-29577# Naval Underwater Systems Center, New London, Conn. Submarine Electromagnetic Systems Dept.
ELF (EXTREMELY LOW FREQUENCY) PVS (PROPAGATION VALIDATION SYSTEM) FIELD STRENGTH MEASUREMENTS, JANUARY AND FEBRUARY, 1978
Peter R. Bannister 3 Feb. 1983 83 p refs

(AD-A126208; NUSC-TR-6775) Avail: NTIS HC A05/MF A01 CSCL 17/2

From September 1976 to December 1978, extremely low frequency (ELF) field-strength and effective-noise measurements were taken aboard operational submarines. The results of measurements taken in Connecticut and aboard two submarines during January and February of 1978 are discussed. Particular attention is focused on simultaneous Connecticut and North-Atlantic-area measurements before, during, and after the 13 February 1978 significant solar-particle event. Author (GRA)

N83-29578# Lincoln Lab., Mass. Inst. of Tech., Lexington.
EHF DIELECTRIC LENS ANTENNA FOR SATELLITE COMMUNICATION SYSTEMS
Walter Rotman 3 Jan. 1983 89 p refs
(Contract F19628-80-C-0002; AF Proj. 2029; AF Proj. 6430)
(AD-A126214; TR-620; ESD-TR-82-102) Avail: NTIS HC A05/MF A01 CSCL 09/5

Dielectric lens antennas are applicable to the design of multiple-beam antenna (MBA) systems on EHF communication satellites. Advantages include excellent wide angle scanning properties and elimination of feed blockage. This report describes an experimental 90 lambda dia. zoned dielectric lens, operating at 44 GHz, which was fabricated and tested in order to estimate the performance of a dielectric lens MBA. Measurements showed that the lens generated a beam with a half-power beamwidth (HPBW) of 0.7 deg which could be steered over a total scan angle of 18 deg (corresponding to the Earth's field-of-view from a geosynchronous satellite) with a scanning loss of less than 1 dB and a gain in excess of 47 dBi measured at the sub-satellite point over a 5% bandwidth. A theoretical analysis of the radiation characteristics of the lens antenna, using ray tracing and geometric optics techniques, gave excellent agreement with the measurements. Simplified design equations were developed to facilitate evaluation and development of lens antenna systems of this type. GRA

N83-29579# Ohio State Univ., Columbus. Electroscience Lab.
JAM RESISTANT COMMUNICATIONS SYSTEMS TECHNIQUES Final Technical Report, Feb. 1979 - May 1982
A. A. Ksienski Griffiss AFB, N.Y. RADC Dec. 1982 320 p refs
(Contract F30602-79-C-0068; AF Proj. 4519)
(AD-A126217; RADC-TR-82-328; ESL-711679-11) Avail: NTIS HC A14/MF A01 CSCL 17/4

The objective of this effort was to develop techniques to increase the jam resistant capability of communication systems. The effort involved the assessment of the limitations, both theoretical and practical, that restrict the effectiveness of adaptive arrays operating in various environments, and wherever possible to overcome these limitations by appropriate design changes. A technique was developed to predict adaptive array performance and provide guidelines for the design of adaptive arrays on complex structures to produce specified performance levels. A cascaded adaptive array consisting of a power inversion stage followed by an LMS stage has been designed, built and tested showing improved dynamic range performances. An angle of arrival estimation system capable of providing accurate angle estimates in the presence of multiple high powered jammers has been developed. The angle of arrival estimate could be utilized to provide pointing information in a demand assignment TDMA SATCOM system employing high gain switchable downlink beams. GRA

N83-29580# Lincoln Lab., Mass. Inst. of Tech., Lexington.
MULTI-DIMENSIONAL SIGNAL PROCESSING RESEARCH PROGRAM Semiannual Technical Summary Report, 1 Apr. - 30 Sep. 1982
Dan E. Dudgeon 30 Sep. 1982 110 p refs
(Contract F19628-80-C-0002; AF Proj. 4594)
(AD-A126333; ESD-TR-82-097) Avail: NTIS HC A06/MF A01 CSCL 17/2

This semiannual technical summary covers the period 1 April through 30 September 1982. It describes the significant results of the Lincoln Laboratory Multi-Dimensional Signal Processing Research Program sponsored by the Rome Air Development Center, in the areas of image segmentation, classification, target detection, and adaptive contrast enhancement. Author (GRA)

N83-29581# Scripps Institution of Oceanography, La Jolla, Calif.
THE INTERACTION OF SHORT-WAVELENGTH INTERNAL WAVES WITH A BACKGROUND CURRENT Ph.D. Thesis
Dave Broutman Dec. 1982 78 p refs
(Contract N00014-80-C-0440)
(AD-A125822; SIO-REF-82-31) Avail: NTIS HC A05/MF A01 CSCL 08/3

Two approaches are used to explore the effects of shear on short-wavelength internal waves. In the first, the Taylor-Goldstein equation is solved exactly. The solutions reveal the inaccuracy of WKB predictions when applied to a curved velocity profile with a minimum Richardson number of order unity. To investigate internal waves in an inertial current, ray calculations are made. This second approach reveals that the process of refractive convergence, which includes the critical-layer interaction as a special case, operates at virtually all phases of the inertial oscillation and affects short waves of nearly all frequencies. It is also found, in contrast to the results of steady shear analyses, that short waves with phase speeds less that the mean flow maximum can propagate for several inertial periods without becoming unstable, and conversely that waves with initial phase speeds of two or three times the mean flow maximum can quickly become focussed to unstably high amplitudes. The final section examines the mean flow induced by three-dimensional, low-frequency, internal wave packets. Rotation alters the character of the flow so that the mean momentum is not equal to E/c, where c is the horizontal phase speed of the short waves and E is the intrinsic energy density. The generation of inertial waves by the internal wave field as found by Hasselmann (1970) for a wave field that is statistically homogeneous in the horizontal, is not predicted by a calculation that incorporates horizontal variations. GRA

N83-29582# Illinois Univ., Urbana. Coordinated Science Lab.
CODING FOR FREQUENCY-HOPPED SPREAD-SPECTRUM CHANNELS WITH PARTIAL-BAND INTERFERENCE Ph.D. Thesis
Wayne Eric Stark Jul. 1982 143 p refs
(Contract N00014-79-C-0424)
(AD-A125872; R-945; UILU-ENG-82-2211) Avail: NTIS HC A07/MF A01 CSCL 17/2

The performance of codes on frequency-hopped spread-spectrum channels with partial-band interference is investigated. The asymptotic performance of codes is measured by the channel capacity and the random coding exponent. The performance of specific codes is measured by the bit error probability. The channel models we consider are quite general and include channels with unknown parameters, channels which change with time, and channels with memory. These models are applicable to frequency-hopped spread-spectrum communication systems as well as to several other communication systems. We formulate the problem of communicating over channels with unknown transition probabilities (i.e., communicating over channels with jamming) as a game theory problem with payoff function being the mutual information between the channel input and the channel output. Under certain restrictions it is shown that memoryless coding and jamming strategies are simultaneously optimal strategies. Next we develop simple, yet accurate, models for many channels with memory that arise in practice. The channel statistics are constant for blocks of symbols of fixed length. The receiver is said to have side information if it can determine the channel statistics for each block of symbols transmitted. GRA

N83-29583# Illinois Univ., Urbana. Coordinated Science Lab.
MULTIDIMENSIONAL SIGNAL RESTORATION AND BAND-LIMITED EXTRAPOLATION, 2
Jorge L. C. Sanz and Thomas S. Huang Dec. 1982 157 p refs
(Contract N00014-79-C-0424)
(AD-A125877; R-973; UILU-ENG-82-2239) Avail: NTIS HC A08/MF A01 CSCL 12/1

This technical report consists of three parts. The central problem is the extrapolation of band-limited signals. In part 1, several existing algorithms for band-limited extrapolation are compared: Two-step procedures appeared to give better reconstructions and require less computing time than iterative algorithms. In part 2, five basic procedures for iterative restoration are unified using a Hilbert Space approach. In particular, all known interative algorithms for extrapolation of band-limited signals are shown to be special cases of Bialy's iteration. The authors also obtained faster algorithms than that of Papoulis-Gerchberg. In part 3, the extrapolation problem is presented in a more general setting: Continuation of certain analytic functions. Presented are two steps procedures for finding the continuation of these functions. Some new procedures for band-limited continuation are also discussed as well as the case in which the signal is contaminated with noise. GRA

N83-29584# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
DATA TRANSMISSION SYSTEMS
7 Feb. 1983 5 p Transl. into ENGLISH of Gos. Obshchesoyuznyy Standart 17422-72 (USSR), 1972 p 1-2
(AD-A126168; FTD-ID(RS)T-1775-82) Avail: NTIS HC A02/MF A01 CSCL 17/2

Data transmission speeds and types of noise suppressing codes for transmission with a narrow band feedback channel are examined. GRA

N83-29585# Navtrol Co., Dallas, Tex.
ANTENNA DIGITAL CONTROL FOR THE DIRECTED MIRROR ANTENNA RADAR (DMAR) Final Report, Oct. 1980 - Feb. 1983
15 Feb. 1983 120 p
(Contract N00173-80-C-0425)
(AD-A125812) Avail: NTIS HC A06/MF A01 CSCL 17/9

The reflector dish of the Radar System antenna is a flat mirrored disc, six feet in diameter, supported by a gimballed structure providing rotational motion in 2 axes. The gimballed structure is such that the 2 axes of rotation intersect at a point which is diametrically centered on the dish but is located just behind it. Encoders and tachometers located on each of the gimbals measure angle and angular rate. Motion of the mirror is provided by 4 hydraulically driven pistons whose construction is such as to provide maximum linearization of the actuation with respect to motion of the dish. Wide dynamic response is a requirement for the system. The radar feed system, which provides appropriate beam shaping in directing the beam towards the mirror, remains stationary eliminating the need for rotating joints. Control of the radar's beams direction is provided for by motion of the mirrored surface. The All Digital Controller is a fast, programmable digital machine dedicated to servo control of multi axis or highly complex systems. Its heart is a digital processor designed specifically for closed loop control. GRA

N83-29586# Los Alamos Scientific Lab., N. Mex.
ACTIVE TUNING OF RF CAVITIES
M. E. Rickey Dec. 1982 10 p
(Contract W-7405-eng-36)
(DE83-007126; LA-9643-MS) Avail: NTIS HC A02/MF A01

An active tuning method for RF cavities for accelerators is investigated. First tests of the method at low power levels are reported. DOE

N83-29587# Institute for Perception RVO-TNO, Soesterberg (Netherlands). Audiology Group.
DESCRIPTION OF STIDAS 2-D. PART 1: GENERAL SYSTEM AND PROGRAM DESCRIPTION
H. J. M. Steeneken and E. Agterhuis Oct. 1982 27 p refs In ENGLISH; DUTCH summary
(IZF-1982-29-Pt-1; TDCK-77329) Avail: NTIS HC A03/MF A01

A physical method for determining the quality of speech transmission channels was developed. The method quantifies the preservation of the intensity fluctuations of speech in a number of parallel frequency bands. From this a physical quantity can be derived which is related to the intelligibility of speech, the speech transmission index. The approach was optimized for a great number of different communication channels, with disturbances such as noise, peak clipping, bandpass limiting, and digital modulation methods. The hardware and software of the measuring device are described. Author (ESA)

N83-29588# Forschungsinstitut der Deutschen Bundespost, Darmstadt (West Germany).
ON THE APERTURE ILLUMINATION OF MULTIBEAM SATELLITE ANTENNAS
Volker Hombach Feb. 1983 29 p refs In GERMAN; ENGLISH summary
(FTZ-454-TBr-36; NI-321-591-186-83) Avail: NTIS HC A03/MF A01

The dimensioning of reflectors with optimal aperture illumination is considered. For circular aperture illuminations of the form A + B 1-(p/a)2 v (a: radius of the aperture, p: radial coordinate) diagrams are presented which show sidelobe level, illumination efficiency, half power beamwidth, and gain in terms of the parameters A and v. Aperture diameter and contour gain are evaluated for an optimally illuminated circular coverage region. The contradicting requirements for low sidelobe level and narrow spacing of adjacent beams are discussed. Considering a formulation for the aperture field, simple relations for the radiation field of reflector antennas can be stated. For a given radiation field it is possible to quickly determine an appropriate aperture spreading and the requisite aperture diameter. Author (ESA)

N83-29589# Forschungsinstitut der Deutschen Bundespost, Darmstadt (West Germany).
A FADING SIMULATOR FOR FREQUENCY SELECTIVE FADING AND MEASUREMENTS WITH A 34 MBIT/S QPSK MODEM
R. Valentin and M. Puhl Dec. 1982 11 p refs In GERMAN; ENGLISH summary
(FTZ-445-TBr-22; NI-321574-142-83) Avail: NTIS HC A02/MF A01

Frequency-selective fading occurring during multipath propagation is studied. A fading simulator for two-path fading was developed, where the indirect wave, delayed by 6.3 nsec relative to the direct wave, was Rayleigh distributed. By variation of the power ratio between the indirect and direct waves (parameter K), it is possible to simulate different fading processes. The fading simulator operates in the IF-band optionally at 70 or 140 MHz. Measurements were carried out on a 34-Mbit/sec QPSK modem with differential encoding. The bit error rate was determined as a function of the signal to noise ratio for different parameters K. The improvement of the signal to noise ratio at low bit rates by use of an adaptive amplitude equalizer was investigated. With K = -10 dB and a bit error rate of 0.00000001, an improvement of 5 dB is achieved. Author (ESA)

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics.*

N83-29590*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
HIGH VOLTAGE ISOLATION TRANSFORMER Patent Application
Carroll H. Clatterbuck and Arthur P. Ruitberg, inventors (to NASA) Filed 30 Jun. 1983 13 p
(NASA-Case-GSC-12817-1; US-Patent-Appl-SN-506477) Avail: NTIS HC A02/MF A01 CSCL 09A

A high voltage isolation transformer is provided with primary

and secondary coils separated by discrete electrostatic shields from the surfaces of insulating spools on which the coils are wound. The electrostatic shields are formed by coatings of a compound having a low electrical conductivity which completely encase the coils and adhere to the surfaces of the insulating spools adjacent to the coils. Coatings of the compound also line axial bores of the spools, thereby forming electrostatic shields separating the spools from legs of a ferromagnetic core extending through the bores. The transformer is able to isolate a high constant potential applied to one of its coils, without the occurrence of sparking or corona, by coupling the coatings lining the axial bores to the ferromagnetic core and by coupling one terminal of each coil to the respective coating encasing the coil. NASA

N83-29591*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
INDUCTION HEATING GUN Patent Application
John Buckley, Robert L. Fox, Robert J. Swaim, and Davis F. Johnston, inventors (to NASA) Filed 24 Jun. 1983 17 p
(NASA-Case-LAR-13181-1; US-Patent-Appl-SN-507623) Avail: NTIS HC A02/MF A01 CSCL 09A

This device of inductively heating and fusing thermoplastics includes an alternating current passing through a tank circuit, the inductor member of the tank circuit being wrapped around a curved pole piece of a ferromagnetic material. The magnetic flux arising within the inductor coil member flows to the ends of the pole piece and into a screen placed between the materials to be joined. The flux induces a current in the screen, and heat is generated to melt the thermoplastics together. Because only 30 to 150 watts of power are passed through the tank circuit, a wire which remains cool under operational wattage is selected, making air or fluid cooling unnecessary. Author

N83-29592*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
ELECTRICAL SELF-ALIGNING CONNECTOR Patent Application
Keith H. Clark and Donald R. Scott, inventors (to NASA) Filed 30 Sep. 1982 13 p
(NASA-Case-MFS-25211-2; US-Patent-Appl-SN-432057) Avail: NTIS HC A02/MF A01 CSCL 09A

A self-aligning electrical connector device is disclosed as including a receptacle component having a conically contoured interior and a plug component having a correspondingly contoured conical body receivable in the receptacle component. The plug component includes a plurality of spaced conductive ring elements 22 having a mating face and the receptacle component includes a plurality of corresponding spaced conductive ring elements providing mating interface with the mating face of the ring elements of the plug component when connected therewith. NASA

N83-29593*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
THREE PHASE POWER FACTOR CONTROLLER Patent Application
Frank J. Nola, inventor (to NASA) Filed 14 Mar. 1983 16 p
(NASA-Case-MFS-25535-2; US-Patent-Appl-SN-476244) Avail: NTIS HC A02/MF A01 CSCL 09A

A power control circuit for a three phase induction motor wherein power factors for the three phases are summed to provide a control signal, and this control signal is particularly filtered and then employed to control the duty cycle of each phase of input power to the motor. NASA

N83-29594*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
HIGH VOLTAGE POWER SUPPLY Patent Application
Arthur P. Ruitberg and Kenneth M. Young, inventors (to NASA) Filed 6 Jul. 1983 26 p
(NASA-Case-GSC-12818-1; US-Patent-Appl-SN-511362) Avail: NTIS HC A03/MF A01 CSCL 09C

A high voltage power supply is formed by three discrete circuits energized by a battery to provide a plurality of concurrent output signals floating at a high output voltage on the order of several tens of kilovolts. Each circuit has a regulator stage. In the first two circuits, the regulator stages are pulse width modulated and include adjustable resistances for varying the duty cycles of pulse trains provided to corresponding oscillator stages while the third regulator stage includes an adjustable resistance for varying the amplitude of a steady signal provided to a third oscillator stage. In the first circuit, the oscillator, formed by a constant current drive network and a tuned resonant network including a step-up transformer, is coupled to a second step-up transformer which, in turn, supplies an amplified sinusoidal signal to a parallel pair of complementary poled rectifying, voltage multiplier stages to generate the high output voltage. Each of the other two circuits include oscillator drive stages which, together with isolation transformers provide output signals floating at the high output voltage. Author

N83-29595*# National Aeronautics and Space Administration. Pasadena Office, Calif.
CARBON GRANULE PROBE MICROPHONE FOR LEAK DETECTION Patent Application
Shakkottai P. Parthasarathy, inventor (to NASA) (JPL, California Inst. of Tech., Pasadena) Filed 1 Jun. 1983 10 p
(Contract NAS7-100)
(NASA-Case-NPO-16027-1; US-Patent-Appl-SN-500044) Avail: NTIS HC A02/MF A01 CSCL 09A

A microphone which is not subject to corrosion is provided by employing carbon granules to sense sound waves. The granules are packed into a ceramic tube and no diaphragm is used. A pair of electrodes, located in the tube adjacent the carbon granules, are coupled to a sensing circuit. Sound waves cause pressure changes on the carbon granules which results in a change in resistance in the electrical path between the electrodes. This change in resistance is detected by the sensing circuit. The microphone is suitable for use as a leak detection probe in recovery boilers, where it provides reliable operation without corrosion problems associated with conventional microphones. NASA

N83-29596*# Thermal Technology Labs., Buffalo, N. Y.
DESIGN AND DEVELOPMENT OF MULTI-kW POWER ELECTRONIC TRANSFORMERS Final Report
James P. Welsh Feb. 1983 20 p refs
(Contract NAS3-21948)
(NASA-CR-168082; NAS 1.26:168082; TTL-83-1) Avail: NTIS HC A02/MF A01 CSCL 09C

A technology for conduction cooled transformers having low internal thermal resistance was developed. To demonstrate this technology a lightweight 25-KVA, 20 kHz, high efficiency, high frequency power transformer was designed and fabricated. The weight of the transformer was 6.95 pounds, the efficiency was 99.2% and the maximum temperature rise in the windings was 43C. S.L.

N83-29597*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
DESIGN OF A HIGH-SPEED DIGITAL PROCESSING ELEMENT FOR PARALLEL SIMULATION
Edward J. Milner and David S. Cwynar Jun. 1983 24 p refs
(NASA-TM-83373; E-1641; NAS 1.15:83373) Avail: NTIS HC A02/MF A01 CSCL 09C

A prototype of a custom designed computer to be used as a processing element in a multiprocessor based jet engine simulator is described. The purpose of the custom design was to give the computer the speed and versatility required to simulate a jet engine in real time. Real time simulations are needed for closed loop testing of digital electronic engine controls. The prototype computer has a microcycle time of 133 nanoseconds. This speed was achieved by: prefetching the next instruction while the current one is executing, transporting data using high speed data busses, and using state of the art components such as a very large scale integration (VLSI) multiplier. Included are discussions of processing element requirements, design philosophy, the architecture of the custom designed processing element, the comprehensive instruc-

tion set, the diagnostic support software, and the development status of the custom design. Author

N83-29598# Rensselaer Polytechnic Inst., Troy, N. Y. Center for Integrated Electronics.
THE DEVELOPMENT OF REFRACTORY METALLIZATION FOR HIGH-SPEED VISI CIRCUITS
A. J. Steckl and T. P. Chow 22 Feb. 1983 48 p refs
(Contract N00014-81-K-0605)
(AD-A125783; TR-4) Avail: NTIS HC A03/MF A01 CSCL 20/12

The use of refractory materials (metals, silicides and composites) in VLSI circuits is reviewed. Material consideration, including deposition techniques, film structure, electrical and mechanical properties, are covered. Gate structures implemented with a variety of refractory materials are described. Semiconductor device processes incorporating these materials, plasma etching, ion implantation, oxidation, are discussed from the perspective of VLSI compatibility. Characteristics of MOS devices and circuits using refractory technology are reviewed. Author (GRA)

N83-29599# Dynamic Systems, Inc., McLean, Va.
OPTICAL SIGNAL PROCESSING Final Report
14 Feb. 1983 14 p refs
(Contract N00014-81-C-2560)
(AD-A125609) Avail: NTIS HC A02/MF A01 CSCL 09/4

Optical signal processing makes possible rapid coordinate transformations, optical pattern recognition, and matrix-matrix multiplication. In the present contract, DSI has demonstrated several significant accomplishments. Among these are: (a) the design and operation of a spatial-frequency-multiplexed coherent optical processor; (b) the application of outer product operation to matrix-matrix multiplication; and (c) the description of three methods for performing Hankel transforms with optical or digital processors. GRA

N83-29600# Illinois Univ., Urbana. Coordinated Science Lab.
ON SEQUENTIAL DETECTION IN DEPENDENT NOISE M.S. Thesis
Chien Kuo Chiang Jun. 1980 60 p refs
(Contract N00014-79-C-0424)
(AD-A125836; R-886; UILU-ENG-80-2218) Avail: NTIS HC A04/MF A01 CSCL 09/4

The problem of designing memoryless sequential detection systems for constant signals in m-dependent noise processes is considered. Particular attention is given to the problem of antipodal signaling in an additive noise channel. Applying the criterion of minimum average sample size, the asymptotically optimal detector is shown to be characterized by the solution to a Fredholm integral equation. A paradox arising from the application of standard asymptotic analysis to this detection system is also considered. In addition, a numerical method and resulting solution to the integral equation or the Gaussian case is also given. Author (GRA)

N83-29601# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
CURRENT DENSITY IN CATHODE SPOTS IN THE CONDENSED DISCHARGE
Emil Zizka 15 Feb. 1983 15 p Transl. into ENGLISH from Chekhoslovatskiy Fiz. Zh. (USSR), no. 7, 1957 p 306-309
(AD-A126221; FTD-ID(RS)T-1874-82) Avail: NTIS HC A02/MF A01 CSCL 09/1

The effects of current density on electrodes was examined. Current density in the cathode spots of a condensed discharge was measured by use of the timesweep method of the traces of discharge on the rotating electrode. The relative dependence of current density is determined in the cathode spot on the material of the electrode and on a change in the current. Author

N83-29602# Stanford Univ., Calif. Electronics Labs.
JOINT SERVICES ELECTRONICS PROGRAM, STANFORD UNIVERSITY Annual Report, 1 Apr. 1981 - 31 Mar. 1982
Dec. 1982 74 p refs
(Contract DAAG29-81-K-0057)
(AD-A126140; SU-AR-1) Avail: NTIS HC A04/MF A01 CSCL 05/1

The existence of radiation from channeled relativistic charged particles was predicted and the first observation of channeling radiation was reported. The initial observation of the spectral lines associated with channeling radiation, many experimental and theoretical investigations followed: particle energies ranged from 1.5 MeV to 10 GeV, and diamond, Si, Ge, Au, LiF, and Ni crystals were used in the experiments. To date, only cubic structure (diamond and simple cubic) crystals were used. Other crystals such as MgF2 with its tetragonal structure and CaF2 with its fluorite structure were prepared. Channeling radiation in diamond with and without the presence of platelets were measured and compared. Platelets are clusters of nitrogen impurities in the form of thin disks present in many natural diamonds. Because they are a single atomic layer thick, the plane of the disks is parallel to the planes of the crystal. GRA

N83-29603# Naval Surface Weapons Center, White Oak, Md. Radiation Div.
THEORY OF GYROTRON AMPLIFIER IN A TAPE HELIX LOADED WAVEGUIDE
Han S. Uhm and Joon Y. Choe Sep. 1982 44 p refs
(ZR01109)
(AD-A126114; AD-F500142; NSWC/TR-82-528; PLASMA-PHYSICS-PUB-82-09) Avail: NTIS HC A03/MF A01 CSCL 09/1

Stability properties of the cyclotron maser instability in an annular electron beam propagating through a cylindrical waveguide loaded with a tape helix are investigated, in connection with applications on the gyrotron amplifier. Closed form of the dispersion relation for the cyclotron maser instability is obtained, including influence of the tape helix in stability behavior. It is shown that the bandwidth of the gyrotron amplifier for a tape helix is narrow in comparison with results for a sheath helix. However, the growth rate of the tape helix gyrotron is comparable to that of the sheath helix gyrotron. GRA

N83-29604# Naval Surface Weapons Center, White Oak, Md. Radiation Div.
THEORY OF GYROTRON AMPLIFIERS IN A DISK OR A HELIX LOADED WAVEGUIDE
Joon Y. Choe and Han S. Uhm Dec. 1982 46 p refs
(ZR01109)
(AD-A126115; AD-F500143; NSWC/TR-82-526; PLASMA-PHYSICS-PUB-82-12) Avail: NTIS HC A03/MF A01 CSCL 09/2

The gyrotron amplifiers in two slow wave structures, the disk and the helix loaded waveguides, are investigated for wide band applications. For each structure, properties of the vacuum waveguide mode are examined in connection with the gyrotron application, and the gyrotron dispersion relation is obtained. For the disk loaded gyrotron, it is found that the group velocity of the waveguide mode can be easily varied by the disk parameters, and the gain and the bandwidth are at least comparable to those of the ordinary gyrotron. In the helix waveguide configuration, the gyrotron utilizing the helix mode can be very broad in its bandwidth. Moreover, the hybrid mode operation, using the helix mode as a carrier, shows possibility of fast wave wide band amplification by contouring waveguide. GRA

N83-29605# Naval Surface Weapons Center, White Oak, Md. Radiation Div.
THEORY OF CUSPTRON MICROWAVE TUBES
Han S. Uhm and Chung M. Kim Oct. 1982 70 p
(ZR01109)
(AD-A126116; AD-F500147; NSWC/TR-82-530; PLASMA-PHYSICS-PUB-82-10) Avail: NTIS HC A04/MF A01 CSCL 09/1

Stability properties of the negative-mass instability in a rotating annular electron beam (E-layer) is investigated, in connection with applications on the cusptron microwave tubes. Analysis is carried

out for an infinitely long E-layer propagating through a magnetron-type conducting wall and propagating parallel to an applied axial magnetic field. We assume that the E-layer is thin and very tenuous. A closed algebraic dispersion relation of the negative-mass instability is obtained, including the important influence of conducting boundaries on the mode control in microwave generation and amplification. It is shown that for typical present experimental beam parameters, gain and efficiency of the cusptron can be more than five times those of the gyrotron. Moreover, with an appropriate geometric configuration, perturbations with azimuthal mode number N can be dominantly unstable, thereby optimizing the microwave power output for radiation with high frequency omega = N times omega sub c, where omega sub c is the electron cyclotron frequency and N is the resonator number in the conducting wall. GRA

N83-29606# Aerodyne Research, Inc., Billerica, Mass.
GENERALIZED MATCHED FILTERS Final Technical Report
H. J. Caulfield, P. E. Mueller, M. H. Weinberg, and A. H. Epstein
Griffiss AFB, N.Y. RADC Jan. 1983 94 p refs
(Contract F19628-80-C-0082)
(AD-A126319; RADC-TR-82-329; ARI-RR-320) Avail: NTIS HC A05/MF A01 CSCL 09/5

Matched filters (MF's) are easy to make optically but fail to take into account either within-class variations or between-class similarities. We show a general method for taking those effects into account. Because our filter reduces to the MF in a simple-enough case, we call it a generalized matched filter (GMF). Because the statistics of the situation govern the GMF, no analytic formula exists and a computer numerical derivation is required. Because the GMF is computer generated, it can not be created by optical means. Instead, it requires a computer generated hologram. Because no adequate computer hologram existed, Aerodyne built such a 'holowriter'. GRA

N83-29607# Illinois Univ., Urbana. Coordinated Science Lab.
LARGE-SCALE CIRCUIT SIMULATION Ph.D. Thesis
You-Pang Wei Dec. 1982 171 p refs
(Contract N00014-79-C-0424)
(AD-A125941; R-977; UILU-ENG-82-2243) Avail: NTIS HC A08/MF A01 CSCL 09/5

The simulation of VLSI (Very Large Scale Integration) circuits falls beyond the capabilities of conventional circuit simulators like SPICE. On the other hand, conventional logic simulators can only give the results of logic levels 1 and 0 with the attendent loss of detail in the waveforms. The aim of developing large-scale circuit simulation is to bridge the gap between conventional circuit simulation and logic simulation. This research is to investigate new approaches for fast and relatively accurate time-domain simulation of MOS (Metal Oxide Semiconductors), LSI (Large Scale Integration) and VLSI circuits. New techniques and new algorithms are studied in the following areas: (1) analysis sequencing (2) nonlinear iteration (3) modified Gauss-Seidel method (4) latency criteria and timestep control scheme. The developed methods have been implemented into a simulation program PREMOS which could be used as a design verification tool for MOS circuits. Author (GRA)

N83-29608# Illinois Univ., Urbana. Coordinated Science Lab.
CAMEL GATE FIELD EFFECT TRANSISTORS Ph.D. Thesis
Robert Edward Thorne Jan. 1983 53 p refs
(Contract N00014-79-C-0424)
(AD-A125942; R-980; UILU-ENG-83-2201) Avail: NTIS HC A04/MF A01 CSCL 09/1

An alternative field effect transistor (FET) structure to the junction FET (JFET) and the metal-semiconductor FET (MESFET), the camel gate FET (CAMFET), is described. This device uses the voltage-variable depletion width of a camel disode for modulating the channel current. By varying the structural parameters of the CAMFET, a wide variety of FET characteristics may be obtained. CAMFETSs can be designed to yield relatively voltage independent transconductances, large forward turn-on voltages, and large gate-drain breakdown voltages, all of which are desirable in large signal applications. CAMFETs with large transconductances desirable in logic applications, may also be obtained. Together with ease of fabrication and potentially improved reliabilities and yields, the many advantages of CAMFETs appear to point to a promising future in both discrete and large scale integrated circuit applications. GRA

N83-29609# Thermo Electron Corp., Waltham, Mass.
LASER-ACTIVATED ELECTRICAL SWITCHING CHARACTERISTICS OF HIGH-CURRENT, LOW-LOSS THERMIONIC DIODES Final Report, Feb. 1979 - Sep. 1982
C. Lee and P. E. Oettinger Sep. 1982 27 p refs
(Contract N00014-79-C-0131)
(AD-A125521; TE350-24-83) Avail: NTIS HC A03/MF A01 CSCL 09/1

This final report summarizes the research from February 1979 to September 1982 conducted under Contract N00014-79-C-0131, on experimentally investigating laser-activated electrical switching of and electron beam formation from cesium coated thermionic and photoemissive surfaces. Two areas were investigated. The first dealt with thermionic emission of electrons from pulse laser heated cesiated surfaces. High power irradiation of cesium-coated metallic targets has generated very dense electron beams. Partially space-charge-limited currents of 2500 A and current densities of 3900 A/sq cm from 9 mm diameter tungsten-rhenium targets have been measured when irradiated by unfocussed 50 MW, 20 ns pulses from a Nd:glass Q-switched laser. The second area of research focussed on CW laser stimulation of cesiated photoemitters. Using an argon-ion laser irradiating wavelength of 488 nm, 2.5 mA of current, at a current density of 80 mA/sq cm, was drawn. GRA

N83-29610# Lincoln Lab., Mass. Inst. of Tech., Lexington.
STEADY STATE PERFORMANCE OF SURVIVABLE ROUTING PROCEDURES FOR CIRCUIT-SWITCHED MIXED-MEDIA NETWORKS
Richard P. Lippmann 29 Dec. 1982 88 p refs
(Contract F19628-80-C-0002)
(AD-A126213; TR-633; ESD-TR-82-107) Avail: NTIS HC A05/MF A01 CSCL 17/2

Three classes of new mixed-media routing procedures are presented for networks with both broadcast and point-to-point transmission media such as the Defense Switched Network. All procedures treat satellite and terrrestrial links separately and use common channel signaling to pass call setup information between switches. Mixed-media routing procedures use fixed routing tables and three different call processing rules. Adaptive-mixed-media routing procedures adapt routing tables when parts of the network are destroyed. Precedence flooding procedures route low-priority calls using mixed-media procedures and high-priority calls using flooding techniques. A steady state network analysis program was modified to evaluate the performance of (1) mixed-media routing with spill-forward control, (2) mixed-media routing with remote Earth station querying and (3) adaptive mixed-media routing. These new routing procedures were compared to modified forward routing and primary path only routing using 20 and 40 node mixed-media networks under overload, with various patterns of offered traffic, and with different amounts and types of network damage. The new routing procedures studied, especially adaptive-mixed-media routing, substantially enhanced network performance after damage. These procedures did not reduce the average point-to-point blocking probability. They did, however, improve the service provided to the most poorly served group of users and they denied the possibility of call completion to the fewest users. GRA

N83-29611# Lincoln Lab., Mass. Inst. of Tech., Lexington.
RESTRUCTURABLE VLSI PROGRAM Semiannual Technical Summary Report, 1 Apr. - 30 Sep. 1982
Peter E. Blankenship 30 Sep. 1982 68 p refs
(Contract F19628-80-C-0002; ARPA Order 3797)
(AD-A126216; ESD-TR-82-108) Avail: NTIS HC A04/MF A01 CSCL 09/5

The main objective of the Lincoln Restructurable VLSI Program

(RVLSI) is to develop methodologies and architectures for implementing wafer-scale systems with complexities approaching a million gates. In our approach, we envisage a modular style of architecture comprising an array of cells embedded in a regular interconnection matrix. Ideally, the cells should consist of only a few basic types. The interconnection matrix is a fixed pattern of metal lines augmented by a complement of programmable switches or links. Conceptually, the links could be either volatile or nonvolatile. They could be of an electronic nature such as a transistor switch, or could be permanently programmed through some mechanism such as a laser. The RVLSI Program is currently focusing on laser-formed interconnect. The link concept offers the potential for a highly flexible, restructurable type of interconnect technology that could be exploited in a variety of ways. For example, logical cells or subsystems found to be faulty at wafer-probe time could be permanently excised from the rest of the wafer. The flexible interconnect could also be used to jump around faulty logic and tie in redundant cells judiciously scattered around the wafer for this purpose. GRA

N83-29612# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ELECTRONIC EQUIPMENT IN MULTIPLE ACCESS INFORMATION SYSTEMS

Jacek Ochman 28 Jan. 1983 27 p Transl. into ENGLISH from Wiad. Telekomunikacyjne (Poland), no. 7-8, 1977 p 198-206
(AD-A126169; FTD-ID(RS)T-1545-82) Avail: NTIS HC A03/MF A01 CSCL 17/2

Elements affecting the efficiency and cost reduction in organizing and using a multiple access system are discussed. The establishment of a proper profile of the system user, the proper choice of the computer and its configuration, and the choice of reliable data transmission equipment is discussed. R.J.F.

N83-29613# Massachusetts Inst. of Tech., Cambridge. Center for Plasma Fusion.

RELATIVISTIC TWO-DIMENSIONAL THEORY OF RF CURRENT DRIVE

K. Hizanidis, V. Krapchev, and A. Pers Feb. 1983 8 p refs Presented at the 5th Topical Conf. on Radio Freq. Plasma Heating, Madison, Wisc., 21-23 Feb. 1983
(Contract DE-AC02-78ET-51013; Grant NSF ECS-79-07047)
(DE83-010250; DOE/ET-51013/73; PFC/CP-83-3; CONF-830210-15) Avail: NTIS HC A02/MF A01

The quasilinear theory of Fisch is extended to include relativistic effects, as well as dependence of the tail perpendicular temperature T/sub perpendicular to/ on the parallel momentum P/sub parallel/. The problem involves a two dimensional Fokker-Planck equation describing the quasilinear relaxation due to the RF spectrum in the presence of collisions and with relativistic effects taken into account. The RF spectrum applies in the region p0 less than or equal to p less than or equal to p1 where p0 and p1 are the left and right matching momenta which respectively connect the region under consideration to the thermal bulk (T/sub E/ approx. = 1 keV) and an outmost Maxwellian tail (T approx. = 1 keV). Author

N83-29614# Scientific Translation Service, Santa Barbara, Calif.

AN INVESTIGATION OF THE BASIC CHARACTERISTICS OF THE RADIATION OF STRAIGHT XENON FLASH TUBES

A. S. Dynikov Jun. 1982 22 p refs Transl. into ENGLISH of summary of dissertation for the title of Candidate of Technical Sciences, Moscow, 1982 24 p Prepared for California Univ., Livermore. Lawrence Livermore Lab.
(Contract W-7405-eng-48)
(DE82-016680; UCRL-Trans-1776) Avail: NTIS HC A02/MF A01

The main accomplishment of the work is simple and empirical scheme of determining the radiation characteristics of straight xenon pulse tubes from the given geometrical and electrical parameters, which can be employed in engineering practice. The scheme is recommended for use in the development and application of pulse tubes under various power-supply conditions with a discharge length of more than 0.3 msec for the prediction of the energy characteristics of the radiation, integrated over the discharge time. The scheme is based on a complex of research, the conclusions of which are given. DOE

N83-29615# Honeywell, Inc., Bloomington, Minn. Physical Sciences Center.

PLANAR OPTICAL SOURCES AND DETECTORS FOR MONOLITHIC INTEGRATION WITH GaAs MESFET ELECTRONICS

R. Kolbas, J. Carney, J. Abrokwah, E. Kalweit, and M. Hitchell 1982 24 p refs Presented at the SPIE Optical Coatings for Energy Efficiency and Solar Appl. Conf., Los Angeles, 25 Jan. 1982
(Contract DE-AC04-76DP-00789)
(DE82-010896; SAND-82-7005C; CONF-820107-7) Avail: NTIS HC A02/MF A01

The monolithic integration of GaAs electronics and light emitting sources (or detectors) is a desirable method for producing compact, reliable, potentially low-cost optoelectronic modules for fiber optic communications. The materials and processing required for optoelectronic components (emitters and detectors) and electronics (FETs) are different and often incompatible. This has been primarily responsible for the relatively slow development of integrated structures. Therefore, it is important that a method be developed for combining the two dissimilar technologies using materials and processes which do not place prohibitive restrictions on the performance or geometry of the optical and electronic devices. The progress and results are presented of an integration scheme termed emitter/detector-in-a-well which presents a simple solution to the problems that have plagued other integration schemes. MESFET compatible AlGaAs light emitting diodes and GaAs-p-n junction detectors have been successfully fabricated on semi-insulating substrates using this new integrating scheme. DOE

N83-29616# Sandia Labs., Albuquerque, N. Mex.

RAPID ANNEALING IN ADVANCED BIPOLAR MICROCIRCUITS

T. F. Wrobel and D. C. Evans Jul. 1982 17 p refs Presented at the IEEE Ann. Conf. on Nucl. and Space Radiation Effect, Las Vegas, Nev., 20 Jul. 1982
(Contract DE-AC04-76DP-00789)
(DE82-018772; SAND-82-0789C; CONF-820708-5) Avail: NTIS HC A02/MF A01

Several new devices technologies were characterized for rapid-annealing following a burst of fast neutrons. The annealing responses for the breakout devices were found to be consistent with those predicted from existing models. An analytical expression derived from the model is presented. Several of the breakout devices studied indicated that digital integrated circuits produced from some of the technologies studied could have neutron hardness levels in excess of 1 x 10 to the 15th power nvt(E > 10 keV). In addition the neutron response data for FAST and ALS and gates are presented. DOE

N83-29617# Mound Lab., Miamisburg, Ohio.

ELECTROTHERMAL RESPONSE TESTING: A COMPONENT DEVELOPMENT TOOL

Alan C. Munger and James M. Powers 16 Apr. 1983 14 p refs
(Contract DE-AC04-76DP-00053)
(DE82-012694; MLM-2900) Avail: NTIS HC A02/MF A01

Electrothermal response testing is a technique for uncovering flaws in component design or manufacturing procedures that no other NDT test can detect. Computer technology, now enabling rapid calculation of thermal quantities, have added to the test since the technique of transient pulse testing was developed. The test measures changes to the environment of a component bridgewater induced by loading the unit or by some sort of environmental exposure. Use of the testing technique has uncovered component flaws that X-ray, resistance testing, or visual inspection have not detected. Although the test does not predict component failure, it does indicate the probability of failure or unwanted conditions, and has become an integral part of component development. DOE

N83-29618# Oak Ridge National Lab., Tenn. Health and Safety Research Div.

BASIC STUDIES OF GASES FOR FAST SWITCHES Semiannual Status Report, 1 Oct. 1982 - 31 Mar. 1983

L. G. Christophorou and S. R. Hunter Apr. 1983 37 p refs (Contract N00014-82-F-0123; Grant DOE-40-1246-82) (AD-A126343) Avail: NTIS HC A03/MF A01 CSCL 09/1

There has been increasing interest in recent years in the possibility of using inductive energy storage devices as a means of storing and transferring energy in numerous repetitive, pulsed-power applications. The major advantages to be realized using this technology are that the intrinsic energy density of these devices are of the older of 100 to 1000 times those for capacitive systems and that this energy can be transferred to the load on the very short-time scale of a few nanoseconds. The major technological problem to be faced when using this type of energy storage system is in the design of a repetitive opening switch. A leading contender for this switching concept is an externally sustained diffuse gas discharge operating at gas pressures of one to several atmospheres. Two possible electron sources have been proposed for the external control of the discharge current. They are by means of gas ionization by pulsed electron beams (e-beams) or by resonant ionization processes of the gaseous medium using a pulsed high power laser. A number of operating parameters may be defined for these types of switches which are common to both switching concepts. These parameters can then form a basis for tailoring specific gases and mixtures to optimize these operating conditions as nearly as possible. GRA

N83-29619# Fraunhofer-Inst. fuer Informations- und Datenverarbeitung, Karlsruhe (West Germany).

OBJECTIVE ACOUSTIC QUALITY INSPECTION BY PATTERN RECOGNITION AND SIGNAL ANALYSIS. DESIGN OF AN INSPECTION SYSTEM AND APPLICATION TO AN ELECTRIC MOTOR Final Report, Jul. 1980

Heinz-Erhard Meier Bonn Bundesministerium fuer Forschung und Technologie Feb. 1983 144 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-005; ISSN-0340-7608) Avail: NTIS HC A07/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 30

An objective acoustic quality inspection measuring method to recognize damaged components and manufacturing defects was developed in order to ease subjective assessment and to improve the certainty of inspection. Quality inspection is regarded as a problem of pattern recognition with the stages signal recording, feature extraction and classification. Feature extraction by signal-adapted processing, based on the physics of the generation of fault-typical noise is considered. Implementation problems concern mainly the comparison with the uncertain subjective assessment, the adaptation to the inspection environment in quantity production and the measurement of a large quantity of objects. Author (ESA)

N83-29620# Karlsruhe Univ. (West Germany). Inst. fuer Theoretische Elektrotechnik und Messtechnik.

LAYOUT ALGORITHMS FOR THE DESIGN OF VERY LARGE SCALE INTEGRATED CIRCUITS USING PARTITIONING Final Report, Mar. 1981

Thomas Dorn, Albert E. Engel, Dieter A. Mlynski, Hans-Juergen Rothermel, and Manfred Wiesel Bonn Bundesministerium fuer Forschung und Technologie Mar. 1983 71 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-018; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 15

Computer aided hierarchical layout of VLSI circuits with building blocks of variable shape and size and with multilayer routing subject to technological and geometrical constraints is described. Basic concepts were developed and algorithms written in FORTRAN and implemented on a PDP-11/60 especially for partitioning into a minimal complete set of cliques; planarization of specific subcircuits like power supply nets; interactive metric placement; strong multilayer routability test; and routing of power supply nets with variable width. Author (ESA)

N83-29621# Technische Hochschule, Aachen (West Germany). Inst. fuer Theoretische Elektrotechnik.

EXTERNAL DEVELOPMENT AND PRODUCTION OF INTEGRATED CIRCUITS Final Report, Jun. 1981

Walter L. Engl and Peter Zdebel Bonn Bundesministerium fuer Forschung und Technologie Mar. 1983 34 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-022; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 7

Development of fully customized integrated circuits of low and medium volume production is considered. Cooperation between semiconductor manufacturers, independent design houses and customers is discussed. A fully customized MSI circuit was made. It is demonstrated that the development and the manufacture of customized integrated circuits can be efficiently carried out for most users. Author (ESA)

N83-29622# AEG-Telefunken, Heilbronn (West Germany). Geschaeftsbereich Elektronische Bauelemente.

INTEGRATED CIRCUITS FOR OPTICAL SENSING AND DISPLAY TECHNIQUES Final Report, Mar. 1982

Gerhard Krumein Bonn Bundesministerium fuer Forschung und Technologie Apr. 1983 86 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-052; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 18

Circuit development and monolithic integrated circuits in bipolar-technology are studied. Light emitting display driving-circuits with analog or digital signal processing were developed and bar displays with 5 or 10 LED's, dot displays with 30 LED's and matrix circuits, able to serve a functional block of 56 LED's were obtained. Light sensitive circuits with analog or digital output were also developed. The analog circuit detects light over several decades with a current output. The digital circuit has a defined threshold characteristic. The main application is an optocoupler-receiver. Author (ESA)

N83-29623# AEG-Telefunken, Heilbronn (West Germany). Geschaeftsbereich Elektronische Bauelement.

MOS-TRANSISTORS FOR POWER APPLICATIONS Final Report, Mar. 1982

Gerd Sixt, Jochen Gerner, Werner Mroczek, Bernd Thomas, and Paul Uebele Bonn Bundesministerium fuer Forschung und Technologie Apr. 1983 132 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-059; ISSN-0340-7608) Avail: NTIS HC A07/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 28

Some VMOS technologies with etched V-grooves were developed for the fabrication of N- and P-channel MOS transistors for power applications. The best results are obtained with a multicellular structure where 1200 small VMOS transistors per sq mm active chip area are paralleled to each other. Several VMOS transistors with chip areas up to 23 mmsq, breakdown voltages between 80 and 550 V and on-resistances as low as 50 m ohm were obtained and experimentally tested. For optimizing on-resistance of VMOS transistors an exact analytical model was developed. The different breakdown mechanisms of VMOS transistors were investigated and suitable edge termination schemes for higher breakdown voltage were developed. Author (ESA)

N83-29624# National Bureau of Standards, Washington, D.C.

TESTING TO QUANTIFY THE EFFECTS OF HANDLING OF GAS

DIELECTRIC STANDARD CAPACITORS
Charles R. Levy Oct. 1982 48 p refs
(PB83-149385; NBS-TN-1161) Avail: NTIS HC A03/MF A01 CSCL 09A

A test method known as the 'Handling and Stability Test' is currently being used at NBS as part of the requirement for the five-part-per-million calibration of gas-dielectric standard capacitors. This test is used to achieve qualitive information on the effects of mechanical shock from shipping and handling on standard capacitors and to rank them quantitatively with respect to these effects. Author (GRA)

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

N83-29625* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
MAGNETIC HEAT PUMPING Patent
Gerald V. Brown, inventor (to NASA) Issued 12 Jul. 1983 9 p
Filed 19 Feb. 1981 Supersedes N82-24449 (20 - 15, p 2082)
(NASA-Case-LEW-12508-3; US-Patent-4,392,356;
US-Patent-Appl-SN-235868; US-Patent-Class-62-3) Avail: US Patent and Trademark Office CSCL 20D

The method employs ferromagnetic or ferromagnetic elements, preferably of rare-earth based material, for example gadolinium, and preferably employs a regenerator. The steps comprise controlling the temperature and applied magnetic field of the element to cause the state of the element as represented on a temperature-magnetic entropy diagram repeatedly to traverse a loop. The loop may have a first portion of concurrent substantially isothermal or constant temperature and increasing applied magnetic field, a second portion of lowering temperature and constant applied magnetic field, a third portion of isothermal and decreasing applied magnetic field, and a fourth portion of increasing temperature and constant applied magnetic field. Other loops may be four sided, with, for example, two isotherms and two adiabats (constant entropy portions.

Official Gazette of the U.S. Patent and Trademark Office

N83-29626 Virginia Univ., Charlottesville.
FLOW IN A PARTIALLY FILLED ROTATING CYLINDER Ph.D. Thesis
Martin Andrew Shadday, Jr. 1982 88 p
Avail: Univ. Microfilms Order No. DA8228587

Axial flow in a rapidly rotating cylinder, partially filled with a viscous, incompressible fluid is measured with a laser-Doppler velocimeter. The cylinder has a vertical axis of rotation, and the axial circulation is induced by rotating a coaxially mounted disk at the top endcap slightly faster than the cylinder. The experimental results are compared with the predictions of a finite-difference model of the flow, and the correlation is qualitatively good. The axial circulation in the fluid layer is confined primarily to E(1/3) shear layers along the lateral boundaries, where E is the Ekman number. The radial transport in the Ekman layers is essentially unaffected by the presence of the free surface. It will be shown that this leads to axial transport in an E(1/3) boundary layer along the free surface. Dissert. Abstr.

N83-29627 Mississippi State Univ., State College.
A GAS JET IMPACTING A CAVITY Ph.D. Thesis
Hazoor Bakhsh 1982 139 p
Avail: Univ. Microfilms Order No. DA8227534

A gas jet impacting a cavity produces secondary jet stagnation temperature much higher than the stagnation temperature of the primary jet. The heating phenomenon from a gas jet cavity impact is investigated. The heating phenomena in resonance tubes and Hilsch vortex tubes is reported. An end wall temperature increase of 235 C is measured in a resonating cavity. A very small hole at the cavity bottom eliminates resonance and produces a secondary jet stagnation temperature identical to the cavity end wall temperature. A secondary jet stagnation temperature increase of 19 C is obtained in high velocity measurements without resonance. Optimum secondary jet temperatures occur in cavities favorable for a good vortex pattern. Flow smoke visualization experiments verified the occurrence of a strong vortex flow at cavity diameter to jet diameter ratios near 1.5. Dissert. Abstr.

N83-29628 Georgia Inst. of Tech., Atlanta.
MEASUREMENT OF PRESSURE-VELOCITY CORRELATIONS IN TURBULENT REACTING FLOWS Ph.D. Thesis
Narayanan Menon Komerath 1982 179 p
Avail: Univ. Microfilms Order No. DA8229896

The pressure-velocity correlation has long posed a major obstacle to the modeling of turbulent flows, due to difficulties in measuring fluctuating pressure and velocity simultaneously in a flow field. Measurements in hot reacting flows encountered in propulsion devices require a new approach. Static pressure fluctuations and the pressure-velocity correlation are derived from simultaneous measurements of total pressure, heat transfer and temperature. A microphone Pitot probe was developed and tested for this application. Hot-film and cooled-film anemometer probes were used to measure heat transfer. Coated platinum-rhodium finewire thermocouples were used to measure temperature. Voltage signals from the probes, recorded simultaneously, are analyzed using a Fourier analyzer system. The probe systems are treated as constant parameter linear systems, and statistical time series analysis is employed to get power and cross spectra and the required correlations. Dissert. Abstr.

N83-29629# United Technologies Research Center, East Hartford, Conn.
LARGE-SCALE SEPARATION AND WAKE CLOSURE/ REATTACHMENT. THE CASCADE PROBLEM
F. T. Smith May 1983 100 p refs
(UTRC83-13) Avail: NTIS HC A05/MF A01

Application in both internal and external flows are considered. An analytical and computational study is described which attempts ultimately to uncover the nature the flow structure surrounding the wake closure region of a long recirculatory eddy following separation off an isolated aerodynamic element. This problem area forms a critical element in the development of a formally rational model for a massive separation eddy at large Reynolds number. An approach is developed here for addressing the external aerodynamic problem through a family of internal, cascade flow, solutions with increasing gap spacing. Each element of this family is formally correct, thus providing a basis for systematic study of the desired limit case of an infinite gap spacing. The structure for finite gap spacing and the corresponding computational results are presented. The possible flow structures emerging for widely spaced cascades and their connection with, and implications for, the external aerodynamic flow are discussed. S.L.

N83-29630# United Technologies Research Center, East Hartford, Conn.
NONUNIQUENESS IN WAKES AND BOUNDARY LAYERS
F. T. Smith May 1983 52 p refs
(UTRC83-15) Avail: NTIS HC A04/MF A01

Instreamlined flow past a flat plate aligned with a uniform stream, it is shown that the Goldstein near wake and the Blasius boundary layer are nonunique solutions locally for the classical boundary layer equations, whereas the Rott-Hakkien very near wake appears to be unique. Concerning non-streamlined flow, new similarity forms are described for the pressure free vicous symmetric closure of a predominantly slender long wake beyond a large-scale separation. Features arising include nonuniqueness, singularities and algebraic behavior, consistent with non-entraining shear layers with algebraic decay. Nonuniqueness also seems possible in reattachment onto a solid surface and for nonsymmetric or pressure

controlled flows including the wake of a symmetric cascade. Author

N83-29631*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PREDICTIONS OF ENTRY HEATING FOR LOWER SURFACE OF SHUTTLE ORBITER
C. L. W. Edwards and Stanley R. Cole Jul. 1983 98 p refs
(NASA-TM-84624; L-15556; NAS 1.15:84624) Avail: NTIS HC A05/MF A01 CSCL 20D

A broad base of thermocouple and phase change paint data was assembled and correlated to the nominal design 14414.1 and proposed STS-1 (first flight of the space transportation system) entry trajectories. Averaged data from phase change paint tests compared favorably with thermocouple data for predicting heating rates. Laminar and turbulent radiation equilibrium heating rates were computed on the lower surface of the Shuttle orbiter for both trajectories, and the lower surface center line results were compared both with aerodynamic heating design data and with flight values from the STS-1 and STS-2 trajectories. The peak laminar heating values from the aerodynamic heating design data book were generally 40 to 60 percent higher than the laminar estimates of this study, except at the 55 percent location of maximum span where the design data book values were less than 10 percent higher. Estimates of both laminar and turbulent heating rates compared favorably with flight data. Author

N83-29632# College of Aeronautics, Cranfield (England).
ATOMIZERS FOR THE AERIAL APPLICATION OF HERBICIDES: IDEAL AND AVAILABLE
John J. Spillman Dec. 1982 20 p refs
(CA-8207; ISBN-0-902937-69-3) Avail: NTIS HC A02/MF A01

Reduction of spray drift is essential when herbicide sprays are applied from aircraft, so sprays with a narrow spectrum and a volume median diameter of about 225 micrometers are required. Analysis of the performance of currently available atomizers suggests that one of the best is a flat fan hydraulic nozzle set at 45 degrees downwards and backwards relative to the flight direction. This atomizes about 33% of the volume emitted within 25% of this desired size. A new 50 mm. diameter windmill disc atomizer produced 70% of the volume emitted in this size range with less than 5% in droplets smaller than 150 micrometers. This is achieved by having far greater control over the actual atomizing condition ensuring ligament formation even at flow rates approaching one litre per minute. A strong radial airflow at the atomizing edges is found to be extremely beneficial. Author

N83-29633# College of Aeronautics, Cranfield (England).
NON-STEADY GAS DYNAMIC EFFECTS IN THE INDUCTION DOMAIN BEHIND A STRONG SHOCK WAVE
J. F. Clarke and R. S. Cant Dec. 1982 27 p refs Presented at the 9th Intern. Colloq. on Dyn. and Explosions and Reactive Systems, Poitiers, France, 3-8 Jul. 1982
(CA-8229; ISBN-0-902937-79-0) Avail: NTIS HC A03/MF A01

Processes in the region between a driving piston or contact surface and a strong shock wave (e.g. Mach number > 1.5) is modelled theoretically as relatively small perturbation events. The combustion reaction is assumed to be of simple irreversible Arrhenius type; perturbations are then of the order of the dimensionless inverse activation energy (typically 1/25). Events behind the shock are then described by either an integral equation, which is solved by straightforward numerical iterative methods, or by a differential equation. The latter reveals the basic physics as a coupling between four limiting processes namely, explosion at constant pressure and at constant volume coupled with wave propagation at the isentropic and isothermal sound speeds. Author

N83-29634*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AN EXPERIMENTAL INVESTIGATION OF THE SUBCRITICAL AND SUPERCRITICAL FLOW ABOUT A SWEPT SEMISPAN WING
William K. Lockman and H. Lee Seegmiller Jun. 1983 249 p refs
(NASA-TM-84367; A-9359; NAS 1.15:84367) Avail: NTIS HC A11/MF A01 CSCL 20D

An experimental investigation of the turbulent, subcritical and supercritical flow over a swept, semispan wing in a solid wall wind tunnel is described. The program was conducted over a range of Mach numbers, Reynolds numbers, and angles of attack to provide a variety of test cases for assessment of wing computer codes and tunnel wall interference effects. Wing flows both without and with three dimensional flow separation are included. Data include mean surface pressures for both the wing and tunnel walls; surface oil flow patterns on the wing; and mean velocity, flow field surveys. The results are given in tabular form and presented graphically to illustrate some of the effects of the test parameters. Comparisons of the wing pressure data with the results from two inviscid wing codes are also shown to assess the importance of viscous flow and tunnel wall effects. S.L.

N83-29635*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
PARABOLIZED NAVIER-STOKES SOLUTIONS OF SEPARATION AND TRAILING-EDGE FLOWS
James L. Brown Jun. 1983 49 p
(NASA-TM-84378; A-9394; NAS 1.15:84378) Avail: NTIS HC A03/MF A01 CSCL 20D

A robust, iterative solution procedure is presented for the parabolized Navier-Stokes or higher order boundary layer equations as applied to subsonic viscous-inviscid interaction flows. The robustness of the present procedure is due, in part, to an improved algorithmic formulation. The present formulation is based on a reinterpretation of stability requirements for this class of algorithms and requires only second order accurate backward or central differences for all streamwise derivatives. Upstream influence is provided for through the algorithmic formulation and iterative sweeps in x. The primary contribution to robustness, however, is the boundary condition treatment, which imposes global constraints to control the convergence path. Discussed are successful calculations of subsonic, strong viscous-inviscid interactions, including separation. These results are consistent with Navier-Stokes solutions and triple deck theory. Author

N83-29636*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
NUMERICAL SIMULATION OF VORTEX BREAKDOWN BY THE VORTEX-FILAMENT METHOD
Y. Nakamura, A. Leonard, and P. R. Spalart Washington Jul. 1983 16 p refs Presented at the AGARD Symp. on Aerodyn. of Vortical Type Flows in Three Dimensions
(NASA-TM-84334; A-9263; NAS 1.15:84334) Avail: NTIS HC A02/MF A01 CSCL 20D

The vortex filament method was applied to the simulation of vortex breakdown. The principal vortex region was represented by multiple filaments, and an axial velocity component was induced by a spiral winding of the filaments. First, an accuracy check was performed for a cylindrical swirling flow with simple analytical expressions for the axial and theta velocities. The result suggests that the flow field is simulated to any accuracy by increasing the number of filaments. Second, an axisymmetric type vortex breakdown was simulated, with experimental data serving as upstream conditions. The calculated axial and theta velocity contours show the breakdown of the vortex, including a rapid change in the vortex core, followed axially by a recovery zone and then a second breakdown. When three dimensional initial data are used the second breakdown appears to be of the spiral type in correspondence with experimental observations. The present method is easily used to simulate other types of vortex breakdown or other vortex flows with axial velocity. Author

N83-29637# Iowa Inst. of Hydraulic Research, Iowa City.
CALCULATION OF THREE-DIMENSIONAL BOUNDARY LAYERS ON BODIES AT INCIDENCE Final Report, Oct. 1980 - Oct. 1982
V. C. Patel and J. H. Baek Sep. 1982 27 p refs Presented at

the 7th US Air Force and Federal Republic of Germany Data Exchange Agreement Meeting Viscous and Interacting Flow Field Effects, Aberdeen Proving Grounds, Md., 26-27 May 1982
(Contract N00014-82-K-0200; Grant AF-AFOSR-0148-80)
(AD-A125634; IIHR-256) Avail: NTIS HC A03/MF A01 CSCL 20/4

Three-dimensional thin boundary-layer equations for laminar and turbulent flows are solved by two different numerical schemes. The methods are applied to the flow over bodies of revolution at incidence and the results are compared with the available experimental data in order to study the range of validity of the classical boundary-layer approximations in regions of increasing circumferential gradients and flow reversal associated with the early stages of a free-vortex type of separation. Comparison with the DFVLR 6:1 spheroid data of Meier et al and the 4:1 combination-body data of Ramaprian, Patel and Choi indicate that the methods perform well in regions where the boundary layer remains thin but the predictions deteriorate as the boundary layer thickens. The results point out the need for the development of methods of handle thick boundary layers and viscous-inviscid interactions.
Author (GRA)

N83-29638# Naval Ship Research and Development Center, Bethesda, Md. Ship Performance Dept.
THE DRAG OF A CIRCULAR CYLINDER ON OR NEAR A FLAT PLAT APPROPRIATE FOR SHIP-MODEL TURBULENCE STIMULATORS
Chao-Ho Sung and Douglas S. Jenkins Feb. 1983 66 p refs
(AD-A126155; DTNSRDC/SPD-1018-01) Avail: NTIS HC A04/MF A01 CSCL 20/4

Experiments were conducted to determine the drag coefficient C(D) of the tripwire and the approximate location of boundary layer flow transition. The investigation was performed with a simplified model of a circular cylinder placed on or near a flat plate. The experimental conditions were those typical of ship-model appendage drag experiments. One of the purposes was to obtain a formula for CD when there is a gap between the cylinder and the flat plate. An example of the drag prediction of an appendage, modeled as a flat plate, is given based on the new C(D) and the prediction method recommended here. A comparison with the result obtained using the prediction method currently in use at DTNSRDC is made. The results indicate that both the effect of a gap, if it exists, on the tripwire drag and the effect of the presence of the tripwire on the turbulent skin friction must be considered. GRA

N83-29639# Washington Univ., Seattle. Dept. of Mechanical Engineering.
ADVERSE PRESSURE GRADIENT CORNER FLOWS Final Report, 1 Mar. 1980 - 30 Nov. 1982
F. B. Gessner 22 Feb. 1983 8 p refs
(Contract N00014-79-C-0276)
(AD-A126059) Avail: NTIS HC A02/MF A01 CSCL 20/4

This project was initiated in order to examine the nature of local flow separation along a streamwise corner in the presence of an adverse pressure gradient. Our results have shown that when the flow separates, a bubble is formed in the corner region which emanates from a singular point on the corner line. The presence of the bubble deflects the adjacent primary flow away from the corner to the extent that the local mean velocity vector is generally skewed in both pitch and yaw. These conditions correspond to a relatively hostile environment for a sensing probe, inasmuch as the mean flow is arbitrarily skewed, and moderate-to-high turbulence intensity fluctuations exist within the separation bubble and in the adjacent flow. Two complementary studies were pursued, namely: (1) the acquisition of mean flow data in a rectangular diffuser with locally detached flow present in the corner regions and (2) the development of a hot-wire response model to accommodate an arbitrarily skewed mean flow across the sensing element. GRA

N83-29640# Arizona Univ., Tucson. Engineering Experiment Station.
CONVECTIVE HEAT TRANSFER IN INTERNAL GAS FLOWS WITH TEMPERATURE-DEPENDENT PROPERTIES Interim Technical Report
Donald M. McEligot (Max-Planck-Inst. fuer Stroemungsforschung) 30 Jun. 1982 159 p refs
(Contract N00014-75-C-0694; NR Proj. 097-395)
(AD-A125901; REPT-1248-1TR2) Avail: NTIS HC A08/MF A01 CSCL 20/4

Literature on internal convective heat transfer to gases and their binary mixtures, at heating rates which cause significant variation of the temperature-dependent transport properties, is reviewed to 1982. First, laminar flows, which are easiest to predict and most difficult to measure, are discussed. Then the problems of treating turbulent flows are considered, followed by the perplexing topic of laminarization - transition from a turbulent flow to a state which may be predicted as if there were no turbulent transport present. The review concludes with a few generalizations that seem pertinent. GRA

N83-29641# Argonne National Lab., Ill.
THERMALLY STRATIFIED TANKS
Roger L. Cole and Frank O. Bellinger 1982 18 p refs Presented at the ASHRAE Natl. Meeting, Toronto, 27 Jun. 1982
(Contract W-7405-eng-38)
(DE83-009089; CONF-820664-12) Avail: NTIS HC A02/MF A01

How tanks fail to stratify is discussed, as well as a new solar collection strategy that allows stratification to be maintained. A theory that models thermally stratified tanks reasonably well is briefly summarized. Tests of tanks fitted with various internal baffle and diffuser configurations are described. Conclusions are: the new collection strategy is essential for maintaining stratification; and most tanks can remain stratified in diurnal cycling. Dip tubes and vertical baffles degrade stratification. Tank walls should have low heat capacity compared to that of water. Tanks with a height to diameter ratio of about four provide the best stratification without excessive thermal losses. Simple inlet and outlet diffusers provide the test thermal stratification. DOE

N83-29642# College of William and Mary, Williamsburg, Va. Dept. of Physics.
THRESHOLDS FOR THE ONSET OF FLUID AND MAGNETO-FLUID TURBULENCE
David Montgomery 1982 19 p refs Presented at the Chalmers Symp. on Plasma Theory and Expt., Aspenaesgarden, Sweden, 16-18 Jun. 1982 Submitted for publication
(Contract DE-AS05-76ET-53045)
(DE82-017202; CONF-820694-1) Avail: NTIS HC A02/MF A01

Hydrodynamic stability theory has focussed on a few simple test cases to obtain the sharpest possible confrontations between theory and experiment. Six of these are briefly reviewed: plane Poiseuille and Couette flow, pipe flow, rotating Couette flow, thermally driven Benard convection, and the Blasius laminar boundary layer. Linear perturbation theory seems inadequate in the first three cases, and satisfactory in the last three. Insufficient information, experimental or theoretical, exists in magnetohydrodynamics to make any comparably decisive tests. DOE

N83-29643# State Univ. of New York, Stony Brook. College of Engineering.
ENERGY TRANSPORT IN POROUS-INSULATOR SYSTEMS. 2: PERFORMANCE OF VERTICAL ENCLOSURES
A. L. Berlad, R. Jaung, N. Joshi, and J. Westerinen Aug. 1982 39 p
(Contract W-7405-eng-26)
(DE82-019894; ORNL/Sub-7551/2) Avail: NTIS HC A03/MF A01

Studies reported are concerned with a limited number of insulator systems types. Low density glass fiber batts have been arranged in vertical orientations within the test section of the Stony Brook 4.0 ft by 5.0 ft double heat transfer gauge test apparatus. In this apparatus, the test section depth can be varied from less than one inch to dimensions of nine inches and above. The principal boundaries of the test section are defined by the innermost aluminum plates of the two 4.0 ft by 5.0 ft heat transfer gauges.

Extensive thermocouple information on temperatures and temperature distributions of all four heat transfer gauge plates is obtained and recorded. Individual thermocouples are read to better than 0.1 F. A schematic of the double heat transfer gauge test apparatus is shown. A discussion of the formula, methods, and expected accuracy of R-value measurements derived from the double heat transfer gauge test apparatus is given. Two general kinds of observations have been made: cellularization effects and convectively induced air intrusion effects. These are discussed. DOE

N83-29644# Virginia Univ., Charlottesville. School of Engineering and Applied Science.
FLOW IN A PARTIALLY FILLED ROTATING CYLINDER Ph.D. Thesis
Martin Andrew Shadday, Jr. May 1982 90 p refs
(Contract DE-AC05-82OR-20900)
(DE82-018309; UVA-ER-756-82U) Avail: NTIS HC A05/MF A01

Axial flow in a rapidly rotating cylinder, partially filled with a viscous, incompressible fluid is measured with a laser Doppler velocimeter. The cylinder has a vertical axis of rotation, and the axial circulation is induced by rotating a coaxially mounted disk at the top endcap slightly faster than the cylinder. The experimental results are compared with the prediction of a finite difference model of the flow, and the correlation is qualitatively good. The axial circulation in the fluid layer is confined primarily to E/sup 1/3/ shear layers along the lateral boundaries, where E is the Ekman number. The radial transport in the Ekman layers is essentially unaffected by the presence of the free surface. It will be shown that this leads to axial transport in an E/sup 1/3/ boundary layer along the free surface. DOE

N83-29645# California Univ., Livermore. Lawrence Livermore Lab.
ESTIMATES OF AIR-COLUMN DENSITY EVOLUTION BEHIND STRONG AIRBLASTS
E. P. Liang Jun. 1982 9 p refs
(Contract W-7405-eng-48)
(DE82-018313; UCID-19429) Avail: NTIS HC A02/MF A01

The behavior of the density profile behind a strong airblast and its scaling with yield in the form of approximate analytical formulae are summarized, and then are applied to obtain the time histories of air column densities out to various radii from the burst point. DOE

N83-29646# California Univ., Livermore. Lawrence Livermore Lab.
BLAST ATTENUATION IN A SHOT TUNNEL USING WATER JETS
L. A. Glenn and D. A. Young 2 Jul. 1982 45 p refs
(Contract W-7405-eng-48)
(DE82-018508; UCID-19419) Avail: NTIS HC A03/MF A01

To evaluate the efficacy of the predictive computer programs used to design the barriers, noise measurements were taken before and after construction of an earth berm and plywood wall alongside I-495 in Northern Virginia. The effect of the barrier was taken as the difference between the before and after drop-offs in noise levels from the roadside to the location under study. The measured effects were compared to the predicted effects. Less than half of the measured effects were within 3 dB of the predicted values. However, when the effects of the time of day and human activity within the neighborhood were taken into account, 65% of the noise values obtained during periods of low human activity were within 3 dB of the predicted values. Thus, it is thought that the computer program can be effectively used in designing noise barriers. Despite intrusive noise periodically overriding the traffic noise from I-495, the latter clearly dominated the neighborhood noise environment. Author (GRA)

N83-29647# Technische Hogeschool, Delft (Netherlands). Lab. for Thermal Power Engineering.
A CONTRIBUTION TO THE NUMERICAL DESCRIPTION OF ROTATING TWO PHASE FLOW Ph.D. Thesis
R. vanderWelle Mar. 1983 268 p refs
(WTHD-153) Avail: NTIS HC A12/MF A01

Measured data for void fraction and bubble velocity in atmospheric rotating and nonrotating air-water flows, for void fractions between 0.25 and 0.75 and superficial liquid velocities ranging from 1.3 to 2.1 m/sec were correlated by power law distribution functions, with exponents given by a function of the cross-sectionally averaged void fraction. The Sauter mean diameters for the bubble size spectra agree with diameters predicted by a theoretical model based on the energy dissipation in the flow. The mass and momentum conservation equations for both phases were solved by a sequential method. A correlation for turbulence viscosity was developed for two-dimensional computations. Author (ESA)

N83-29648# Karlsruhe Univ. (West Germany). Inst. fuer Stroemungslehre und Stroemungsmaschinen.
TIME-DEPENDENT CONVECTION Final Report, Mar. 1982
Karl-Reiner Kirchartz Bonn Bundesministerium fuer Forschung und Technologie Apr. 1983 67 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-83-001; ISSN-0170-1339) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 14

The possibility of buoyancy driven convection flows in a space laboratory submitted to time dependent g disturbances with maximal amplitudes up to 0.1g are investigated. A finite difference method is used to simulate the transient development of thermal convection in rectangular enclosures. The influence of step function, single pulse, pulse sequence, sinus function and a typical acceleration profile of a crew motion are studied. The temporal development of the flow field is calculated for different Rayleigh numbers, Prandtl numbers and frequencies. The transient behavior of the convection flow significantly depends on whether temperature gradient and direction of acceleration are parallel (cellular convection or perpendicular (free convection) to each other. This is confirmed by analytical solutions of unsteady convection. By means of similarity laws the results are transferred to the conditions of microgravity in a space laboratory. Investigation of planned space experiments shows that disturbances by convection flows are only possible in extreme cases, especially if g pulses of high amplitude occur. Author (ESA)

N83-29649# Erno Raumfahrttechnik G.m.b.H., Bremen (West Germany).
FLUID DYNAMIC EXPERIMENT IN A SURFACE TENSION TANK: PHASE 1/PHASE 2A Final Report, Jun. 1981
Gaston Netter and Klaus Eckhardt Bonn Bundesministerium fuer Forschung und Technologie Apr. 1983 26 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-W-83-002; ISSN-0170-1339) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 5,50

A space shuttle tank/fluid dynamic experiment scheduled for the Get Away Special program is described. The experiment determines the low g fluid dynamic effects as a reaction due to excitation. The dynamic parameters of a fluid/tank system are evaluated. In parallel, analytical investigations result in the form of an equivalent mechanical model. The experimental data, obtained using a small diameter tank, were compared to the predictions of the mechanical model. The design concept of experiment requires an extremely sensitive and precise measurement system since slosh forces on the order of 0.01 N are expected. Author (ESA)

N83-29215*# California Univ., Irvine. Dept. of Mechanical Engineering.
EFFECT OF LIQUID DROPLETS ON TURBULENCE STRUCTURE IN A ROUND GASEOUS JET
S. E. Elghobashi and A. M. Mostafa *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 55-64 refs
(For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 20D

N83-29216*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
DILUTION ZONE MIXING
James D. Holdeman *In its* Combust. Fundamentals Res. Mar. 1983 p 65-76 refs (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 20D

N83-29217*# Michigan State Univ., East Lansing. Dept. of Mechanical Engineering.
INFLUENCE OF A LARGE FREE STREAM DISTURBANCE LEVEL ON DYNAMICS OF A JET IN A CROSS FLOW
John J. Foss and Candace E. Wark *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 77-84 (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 20D

N83-29222*# United Technologies Research Center, East Hartford, Conn.
MASS AND MOMENTUM TURBULENT TRANSPORT EXPERIMENTS
B. V. Johnson *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 131-140 (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 20D

N83-29223*# Stanford Univ., Calif. Dept. of Mechanical Engineering.
VELOCITY VISUALIZATION IN GASEOUS FLOWS
R. K. Hanson, J. C. McDaniel, and B. Hiller *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 141-146 (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 20D

N83-29224*# Arizona State Univ., Tempe. Dept. of Mechanical and Aerospace Engineering.
MODELING OF FLUCTUATING MASS FLUX IN VARIABLE DENSITY FLOWS
Ronald M. C. So, H. C. Mongia, and M. Nikjooy *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 147-160 (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 20D

N83-29225*# Michigan Univ., Ann Arbor. Dept. of Mechanical Engineering and Applied Mechanics.
MONTE CARLO MODELING IN ELLIPTIC FLOWS
Krishnan Radhakrishnan *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 161-169 refs (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 20D

N83-29232*# California Inst. of Tech., Pasadena.
UNSTEADY FLOW EFFECTS IN COMBUSTOR SYSTEMS
Malladi V. Subbaiah *In* NASA. Lewis Research Center Combust. Fundamentals Res. Mar. 1983 p 239-248 refs (For primary document see N83-29208 18-07)
Avail: NTIS HC A12/MF A01 CSCL 20D

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources.* For related information see also *06 Aircraft Instrumentation,* and *19 Spacecraft Instrumentation.*

N83-29650* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
METHOD AND APPARATUS FOR SUPERCOOLING AND SOLIDIFYING SUBSTANCES Patent
Lewis L. Lacy, Michael B. Robinson, Thomas J. Rathz, Lester Katz, and Daniel B. Nisen, inventors (to NASA) Issued 28 Jun. 1983 7 p Filed 23 Mar. 1981 Supersedes N81-24413 (19 - 15, p 2059)
(NASA-Case-MFS-25242-1; US-Patent-4,389,904;
US-Patent-Appl-SN-246773; US-Patent-Class-73-863.11;
US-Patent-Class-374-17) Avail: US Patent and Trademark Office CSCL 14B

An enclosure provides a containerless environment in which a sample specimen is positioned. The specimen is heated in the containerless environment, and the specimen melt is dropped through the tube in which it cools by radiation. The tube is alternatively backfilled with an inert gas whereby the specimen melt cools by both radiation and convection during its free fall. During the free fall, the sample is in a containerless, low-gravity environment which enhances supercooling in the sample and prevents sedimentation and thermal convection influences. The sample continues to supercool until nucleation occurs which is detected by silicon photovoltaic detectors. The sample solidifies after nucleation and becomes completely solid before entering the detachable catcher. The amount of supercooling of the specimen can be measured by knowing the cooling ratio and determining the time for nucleation to occur.

Official Gazette of the U.S. Patent and Trademark Office

N83-29651* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
INSTRUMENT FOR DETERMINING COINCIDENCE AND ELAPSE TIME BETWEEN INDEPENDENT SOURCES OF RANDOM SEQUENTIAL EVENTS Patent
James I. Clemmons, Jr., inventor (to NASA) Issued 12 Jul. 1983 10 p Filed 10 Jul. 1981 Supersedes N81-31529 (19 - 22, p 3064)
(NASA-Case-LAR-12531-1; US-Patent-4,392,749;
US-Patent-Appl-SN-282191; US-Patent-Case-368-118;
US-Patent-Case-368-6; US-Patent-Case-368-9;
US-Patent-Case-368-10; US-Patent-Case-368-119;
US-Patent-Case-368-120) Avail: US Patent and Trademark Office CSCL 14B

An instrument that receives pulses from a primary external source and one or more secondary external sources and determines when there is coincidence between the primary and one of the secondary sources is described. The instrument generates a finite time window (coincidence aperture) during which coincidence is defined to have occurred. The time intervals between coincidence apertures in which coincidences occur are measured.

Official Gazette of the U.S. Patent and Trademark Office

N83-29652* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
DEGASSIFYING AND MIXING APPARATUS FOR LIQUIDS Patent
Samuel T. Yamauchi, inventor (to NASA) (Rockwell International Corp., Downey, Calif.) Issued 12 Jul. 1983 6 p Filed 25 Nov. 1981 Supersedes N82-22329 (20 - 13, p 1773) Sponsored by NASA
(NASA-Case-MSC-18936-1; US-Patent-4,392,874;
US-Patent-Appl-SN-325082; US-Patent-Class-55-194;
US-Patent-Class-55-202) Avail: US Patent and Trademark Office CSCL 14B

An apparatus for degassing a liquid comprises a containment vessel a liquid pump and a header assembly (12) within the containment vessel in a volume above the reservoir of the liquid. The pump draws from this reservoir and outputs to the header assembly, the latter being constructed to return the liquid to the reservoir in the form of a number of stacked, vertically spaced, concentric, conical cascades via orifices. A vacuum source provides a partial vacuum in the containment vessel to enhance the degassing process.

Official Gazette of the U.S. Patent and Trademark Office

N83-29653 Netherlands Organization for Applied Scientific Research TNO, Delft. Hoofdgroep Maatschappelijke Technologie.

APPLICATION OF THERMISTORS TO MEASURE AIR FLOW VELOCITIES VERY CLOSE TO SURFACES [TOEPASSING VAN THERMISTOREN VOOR HET METEN VAN LUCHTSNELHEDEN ZEER DICHT LANGS OPPERVLAKKEN]

P. E. J. Vermeulen Dec. 1981 24 p refs In DUTCH
(TNO-81-016265) Avail: Issuing Activity

Problems using thermistors close to plane walls are discussed. Analysis of the thermistor probe heat balance shows that reducing the measurement height to 2 mm has no important consequences. At still lower heights direct heat conduction to the wall can play a role. Flow interference effects between wall and thermistor at small heights are unclear. Experimental investigation shows that the thermistor probe accuracy at 2 mm from the wall is the same as at 8 mm. Conditions for extrapolation in order to assess the shear stress are given. Author (ESA)

N83-29654*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

SECURABLE BEARING STRESS-STRAIN INDICATOR Patent Application

Moses J. Long, inventor (to NASA) Filed 27 Jun. 1983 13 p
(NASA-Case-LAR-12774-1; US-Patent-Appl-SN-508390) Avail: NTIS HC A02/MF A01 CSCL 14B

The invention relates to a stress-strain indicator for indicating torque on a fastening member or other tensile structure. The device is particularly useful in the continued monitoring of torque on the bolts incorporated in pressure vessels and other high stress structures. The device indicates torque by utilizing the principles of stress-strain; a given stress on a bolt will result in a calculable amount of strain (stretching) within the shaft of the bolt. A test pin, therefore, is inserted through an axial bore in the bolt and is anchored with respect to the bolt at a point along its length. A washer is positioned between a flange of the test pin and the bolt head; the washer and the flange are separated by a space. Torque on the bolt changes its length; the length change causes axial displacement of the test pin with the resultant progressive elimination of the space until the washer is secured at the calibrated torque. NASA

N83-29655*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

DYNAMIC-PRESSURE MEASUREMENTS USING AN ELECTRONICALLY SCANNED PRESSURE MODULE

William G. Chapin Jul. 1983 24 p refs
(NASA-TM-84650; L-15583; NAS 1.15:84650) Avail: NTIS HC A02/MF A01 CSCL 14B

Frequency response was measured for different lengths and diameters of tubing between a sinusoidal pressure source and a pressure sensing module from an electronically scanned pressure measuring system. Measurements were made for straight runs of both steel and vinyl tubing. For steel tubing, measured results are compared with results calculated by using equations developed by Tijdeman and Bergh. Measurements were also made with a bend in the vinyl tubing at the module. In addition, measurements were made with two coils placed in the tubing near the middle of the run. Author

N83-29656# Texas Instruments, Inc., Dallas. Equipment Group.

SUPERCONDUCTING NIOBIUM THIN-FILM GRADIOMETER TECHNOLOGY PROGRAM Final Report, 4 Jan. 1982 - 17 Jan. 1983

Spencer A. Buckner 14 Mar. 1983 41 p refs
(Contract N00014-82-C-0163)
(AD-A126133) Avail: NTIS HC A03/MF A01 CSCL 08/14

Dc SQUIDs with 2.5 micron square niobium-aluminum oxide-niobium tunnel junctions and titanium resistive shunts have been fabricated. The SQUID inductance was 0.9 nH, and the shunt resistors were approximately 10 ohms. With the SQUIDs operated in a small-signal amplifier mode the minimum white noise of the SQUIDs was measured. Low frequency noise was measured form 0.005 to 2 Hz with the SQUIDs operated in a closed-looped negative-feedback mode. A straight line with a slope of -20 db/decade (1/f frequency dependence) fits the data below 0.5 Hz. This line intersects a horizontal line through the white noise at about 1.6 Hz. A design was completed of a thin-film gradiometer with one-inch square pickup loops, a baseline of 1.1 inches, and a 50-turn input coil, which will fit on a 3-inch diameter silicon wafer. The sensitivity of this gradiometer was predicted. Fabrication of this completely integrated thin-film gradiometer made only of refractory metals should provide an excellent means of predicting the achievable sensitivity and balance of an airborne magnetic gradiometer. GRA

N83-29657# Naval Surface Weapons Center, White Oak, Md. Strategic Systems Dept.

SELECTION AND CALIBRATION OF PRESSURE TRANSDUCERS FOR LOW PRESSURE MEASUREMENT (0.001 psia) IN THE TUNNEL 9 HIGH ALTITUDE SIDE FORCE TEST (WTR 1365)

Mark M. Roberts Sep. 1982 25 p refs
(AD-A125475; AD-F500132; NSWC/MP-82-442) Avail: NTIS HC A02/MF A01 CSCL 14/2

A study of potential methods for measuring extremely low pressures (0.001 psia) in the NSWC Hypervelocity Wind Tunnel No. 9 was undertaken. Candidate techniques were evaluated in terms of compatibility with wind tunnel models, accuracy, response time, and availability. A detailed calibration was performed on random Microswitch, Model 130 PC transducers to check linearity, hysteresis, sensitivity, and repeatability. The effect of tube length and diameter on the response time of a pressure measuring system was also considered. GRA

N83-29658# Edgerton, Germeshausen and Grier, Inc., Salem, Mass. Electronic Components Div.

PHASE 2B PROTOTYPE REDESIGN, TACTICAL RUBIDIUM FREQUENCY STANDARD Final Technical Report, 16 Jun. - 16 Oct. 1982

William J. Riley Griffiss AFB, N.Y. RADC Jan. 1983 12 p refs
(Contract F19628-82-C-0055; AF Proj. 2277)
(AD-A126320; RADC-TR-83-8) Avail: NTIS HC A02/MF A01 CSCL 14/2

This report summarizes the progress made during Phase 2B of an effort to develop a tactical rubidium frequency standard (TRFS) for the U.S. Air Force SEEK TALK program. The overall objective is to achieve a production capability for an extremely small, rugged and fast warmup atomic clock for avionics applications. This phase of the program accomplished the redesign of the previous bench version into a prototype configuration. Projected prototype size is 2.5 x 2.5 x 4.0 inches. Author (GRA)

N83-29659# Sandia Labs., Albuquerque, N. Mex.

OPTICALLY RECORDING VELOCITY INTERFEROMETER SYSTEM (ORVIS) FOR SUBNANOSECOND PARTICLE-VELOCITY MEASUREMENTS IN SHOCK WAVES

D. D. Bloomquist and S. A. Sheffield 1982 11 p refs Presented at the 15th Intern. Cor.gr. on High Speed Phot. and Photonics, San Diego, Calif., 21 Aug. 1982
(Contract DE-AC04-76DP-00789)
(DE82-017621; SAND-82-1368C; CONF-820824-3) Avail: NTIS HC A02/MF A01

An optically recording velocity interferometer system (ORVIS) has been developed to measure particle velocity with subnanosecond resolution for shock waves in condensed matter. The fringe pattern of a wide-angle Michelson interferometer was focused as a set of dots on the slit of a high speed streak camera, resulting in a continuous record of the fringe position as a function of time. This technique was employed to measure the particle velocity of a witness foil in a series of experiments to study the nature of detonation-driven shock waves. The present experiments demonstrated a time resolution of about 300 ps, and we believe that 20 ps resolution may be achievable with this technique. The improvement in time resolution of up to two orders of magnitude over current diagnostic techniques will be an aid in the study of several aspects of shock wave phenomena such as shock front thickness, detonation wave theory, fast relaxation at an impact

plane, and fine structure in shock fronts associated with chemical reaction. Author

N83-29660# Washington State Univ., Pullman. Lab. for Thermal Energy.

VENTURI DESIGN FOR METERING SOLIDS FLOW IN GAS-SOLIDS SUSPENSIONS Final Report

C. T. Crowe 1 Dec. 1982 108 p refs

(Grant DE-FG22-80PC-30212)

(DE83-004314; DOE/PC-30212/T4) Avail: NTIS HC A06/MF A01

The utility of venturimeters to meter the flow rate of gas-solid suspensions was investigated. The data show that the pessure drop between the pipe and throat varies linearly with solids mass flow rate at a given gas mass flow rate. The slope of this curve, which is related to the pressure ratio parameter, provides a measure of sensitivity of venturimeter to loading (solids/gas mass flow ratio). The optimum geometry consisted of a flow nozzle configuration with an extended throat section. The performance was considerably improved over the conventional venturi. An annular venturi geometry with two approach angles was tested. It performed equivalently to a conventional venturi, but could be located as close as five diameters to an upstream elbow with no deterioration in performance. Also, the data show that venturi performance is unaffected by orientation of venturi (horizontal or vertical). The effect of particle size distribution is not easily quantified. The total head loss measurements showed that there were no excessive head losses associated with gas-solids flow in a venturimeter. DOE

N83-29661# California Univ., Berkeley. Lawrence Berkeley Lab. Engineering and Technical Services Div.

DESIGN ANALYSIS AND PERFORMANCE EVALUATION OF A TWO-DIMENSIONAL CAMERA FOR ACCELERATED POSITRON-EMITTER BEAM INJECTION BY COMPUTER SIMULATION

J. Llacer, A. Chatterjee, E. K. Batho, and J. A. Poskanzer May 1982 10 p refs Presented at the IEEE Nucl. Sci. Symp., Washington, D.C., 20-22 Oct. 1982

(Contract DE-AC03-76SF-00098; Grant NIH-CA-27024-02)

(DE83-005866; LBL-14450; CONF-821011-45) Avail: NTIS HC A02/MF A01

The characteristics and design of a high-accuracy and high sensitivity 2-dimensional camera for the measurement of the end-point of the trajectory of accelerated heavy ion beams of positron emitter isotopes are described. Computer simulation methods have been used in order to insure that the design would meet the demanding criteria of ability to obtain the location of the centroid of a point source in the X-Y plane with errors smaller than 1 mm, with an activity of 100 nanoCi, in a counting time of 5 sec or less. A computer program which can be developed into a general purpose analysis tool for a large number of positron emitter camera configurations is described in its essential parts. The validation of basic simulation results with simple measurements is reported, and the use of the program to generate simulated images which include important second order effects due to detector material, geometry, septa, etc. is demonstrated. Comparison between simulated images and initial results with the completed instrument shows that the desired specifications have been met. DOE

N83-29662# California Univ., Livermore. Lawrence Livermore Lab.

DESIGN OF NEUTRON STREAK CAMERA FOR FUSION DIAGNOSTICS

C. L. Wang, R. Kaiibjian, and M. S. Singh Jun. 1982 14 p refs Presented at the 15th Intern. Congr. on High Speed Phot. and Photonics, San Diego, Calif., 22-27 Aug. 1982

(Contract W-7405-eng-48)

(DE82-018393; UCRL-66162-Rev-1; CONF-820824-7-Rev-1) Avail: NTIS HC A02/MF A01

The D-T burn time for advanced laser fusion targets is calculated to be very short, < 50 ps. The design of a neutron streak camera of 16 ps resolving time that is used to study the temporal history of fusion burn is described. The cathode of the neutron streak camera is sensitive to neutrons and is curved such that the difference in the neutron path lengths from a point source to various parts of the cathode is compensated by electron transit times within the streak tube. Thus the cathode can be made large for high sensitivity, without sacrificing time resolution. The cathode is coated with 1 micrometers UO2. Each fission fragment leaving the cathode generates 400 secondary electrons that are all < 20 eV. These electrons are focused to a point with an extractor and an anode, and are then purified with an electrostatic deflector. The electron beam is streaked and detected with the standard streak camera techniques. Careful shielding is needed for X-rays from the fusion target and general background. DOE

N83-29663# California Univ., Livermore. Lawrence Livermore Lab.

INVESTIGATIONS OF OTHER OPERATING POINTS FOR THE RCA STREAK TUBE IN THE LAWRENCE LIVERMORE NATIONAL LABORATORY STREAK CAMERA

S. W. Thomas, R. L. Peterson, and R. L. Griffith Jul. 1982 8 p refs Presented at the 15th Intern. Congr. on High Speed Phot. and Photonics, San Diego, Calif., 22-27 Aug. 1982

(Contract W-7405-eng-48)

(DE82-019065; UCRL-87752; CONF-820824-9) Avail: NTIS HC A02/MF A01

The soft X-ray streak camera uses the RCA C73435 streak tube body fitted with a removable X-ray cathode. The front of the streak tube is exposed to the vacuum of an experimental chamber, which is not entirely under the control of a streak camera operator. Occasionally, the vacuum becomes poor enough to cause corona and arcing from the cathode to the chamber wall. The corona problem is more difficult because the dimensions of the X-ray camera body are smaller than for the optical camera body. Therefore, the effects on camera performance of decreasing the accelerating voltage at the cathode from the customary 17 kV was investigated. Several operating points were evaluated and 12 kV cathode to anode with 5 kV cathode to grid were selected for more detailed investigation. Transverse spatial resolution and dynamic range were found to be essentially the same as at our normal operating point of 17 kV for the cathode and 2500 V on the grid. DOE

N83-29664# California Univ., Livermore. Lawrence Livermore Lab.

EXECUTIVE COMMITTEE REPORT: GEOTECHNICAL INSTRUMENTATION WORKING GROUP MEETING

D. G. Wilder, F. Rogue, W. R. Beloff (Soil and Rock Instrumentation Co., Newton Upper Falls, Mass.), E. Binnall (California Univ., Berkeley. Lawrence Berkeley Lab.), and E. C. Gregory (Rockwell Hanford Operations, Richland, Wash.) 26 Apr. 1982 54 p Presented at the Am. Soc. of Civil Engr. Conf. Geotech. Conf. and Exhibit, Las Vegas, Nev., 26-28 Apr. 1982

(Contract W-7405-eng-48)

(DE82-012837; UCRL-87183; CONF-820422-3) Avail: NTIS HC A04/MF A01

Responding to the widespread need for the geotechnical community to discuss instrumentation for nuclear waste repositories, a meeting was held December 2 and 3, 1981, in Denver, Colorado. This report gives the group's consensus recommendations to aid in making decisions for development of instrumentation for future repository work. The main conclusions of the working group meeting were as follows: (1) monitoring of geotechnical parameters in nuclear waste repositories will be necessary to meet licensing requirements; (2) currently available instruments are underdeveloped for this monitoring; (3) research and development to provide adequate instrumentation will need to be performed under federal sponsorship by national laboratories, universities, contractors, and consultants; and (4) a NASA-type reliability program is needed to meet the quality assurance, durability, calibration, and time schedule demands of geotechnical instrumentation development. DOE

N83-29665# Sandia Labs., Albuquerque, N. Mex.
A DATA MEMORY SYSTEM FOR A SEAFLOOR-EARTHQUAKE-MEASURING INSTRUMENT
D. E. Ryerson and A. A. Lopez 1982 9 p refs Presented at the Intern. Telemetering Conf., San Diego, Calif., 28 Sep. 1982
(Contract DE-AC04-76DP-00789)
(DE82-016808; SAND-82-0911C; CONF-820920-1) Avail: NTIS HC A02/MF A01

A Seafloor Earthquake Measurement System for measuring strong motion seismic data was developed and tested as part of the Offshore Instrumentation Program. The system's function is to gather data for the design and regulation of offsore structures such as oil platforms and pipelines. The seafloor package is a self contained unit capable of operating unttended for up to one year with data readout on command via an underwater acoustic telemetry system. One of the problems with such a system is the large memory required to store seismic data. This memory also must consume very little power to conserve batterylife. To meet these conditions a combination low power. CMOS buffer memory and a one million bit magnetic bubble main memory with switched power was developed. These memories and how they are controlled by a microprocessor to save the best data since the last data readout are described. DOE

N83-29666# National Lab. for High Energy Physics, Ibaraki-Ken (Japan).
TESTS OF A RESONANCE DETECTOR SPECTROMETER FOR ELECTRON-VOLT SPECTROSCOPY
J. M. Carpenter (Argonne National Lab., Ill.), N. Watanabe, S. Ideda, Y. Masuda, and S. Sato 1982 13 p refs Presented at 6th Intern. Collaboration on Advan. Neutron Sources, Argonne, Ill., 27 Jun. - 2 Jul. 1982
(Contract W-31-109-eng-38)
(DE83-007611; CONF-8206118-10) Avail: NTIS HC A02/MF A01

A resonance detector spectrometer at the KENS neutron source, using Ta-181, Sb-121, and Sm-149 absorbers and bismuth germanate (BGO), NaI and plastic scintillators was tested. In the process numerous background problems were solved, a time-focussing principle was discovered. The scattering from a number of materials was measured and results for bismuth and graphite were analyzed. Tests of cooled absorbers have indicated that resolution of 70 MeV is possible with Ta-181. DOE

N83-29667# Los Alamos Scientific Lab., N. Mex.
LOS ALAMOS PORTABLE BETA-RAY SPECTROMETER
B. H. Erkkila, R. J. Brake, and D. A. Waechter 1983 8 p refs Presented at the Intern. Beta Dosimetry Symp., Washington, D.C., 15-17 Feb. 1983
(Contract W-7405-eng-36)
(DE83-007575; LA-UR-83-290; CONF-830204-4) Avail: NTIS HC A02/MF A01

The integration of a beta ray detector to multichannel analyzer and computer has resulted in a portable spectrometer for studying beta rays in the field. The detector is a 5 cm diameter by 2 cm thick plastic scintillator. Other detectors can easily be integrated into the package. The integral instrument package is 15 cm wide by 15 cm high by 25 cm long and weighs less than 10 pounds. Internal rechargeable batteries for 8 hours of field operation are included. The instrument contains a detector, an amplifier, a multichannel analyzer, and a liquid crystal display (LCD). A microprocessor controls all the functions of the instrument and is programmed to display all necessary information and 128 channel spectra on the LCD. DOE

N83-29668# Sigma Research, Inc., Richland, Wash.
OPTICAL PROBE FOR STEAM-GENERATOR-TUBE DENT MEASUREMENT Final Report
D. L. Oberg Feb. 1983 46 p Sponsored by EPRI
(EPRI Proj. S181-1)
(DE83-901484; EPRI-NP-2863) Avail: NTIS HC A03/MF A01

An optical profilometer to measure tube denting in steam generators is discussed. A prototype and field-hardened devices were constructed. As the noncontacting, microprocessor-controlled probe is pushed or pulled through tubing at 6 inches (150 mm) per second, the optic section (rotating at 4000 rpm) scans the surface and collects data at 48 points around the circumference. Optics are arranged so that, when data points are focused on a lateral cell, displacements along the cell are proportional to variations in tube radius. Profile data are stored on floppy diskettes and can be called up and displayed on a video monitor in one of three formats that depict deviations from nominal on a magnified scale. Both probes were tested on tube samples. DOE

N83-29669# Rolls-Royce Ltd., Derby (England).
TRANSDUCER RELIABILITY IN ENGINEERING RESEARCH AND DEVELOPMENT
D. Watts 28 Jun. 1982 19 p
(PNR-90147; Reprint-838) Avail: NTIS HC A02/MF A01

The failure statistics of 1400 transducers of all types used to measure pressure, flow, vibration and movement are analyzed. Physical damage is the prominent failure factor with 47% of 112 transducers failures. Strain gage statistics are examined separately showing a 9.4% failure rate in 3500 applications. Handling of transducers is shown to be the least well controlled factor. Failures due to over range, contamination, low sensitivity and electronics are also studied. Author (ESA)

N83-29670# Rolls-Royce Ltd., Derby (England).
IMPROVING THE ACCURACY OF THERMOCOUPLE TEMPERATURE MEASURING CIRCUITS
K. Stringfellow 22 Apr. 1980 11 p refs
(PNR-90148; Reprint-839) Avail: NTIS HC A02/MF A01

The voltage measurement accuracy in thermocouple circuits used for air/gas temperature measurements in gas turbine aero engines is discussed. A circuit composed of three sections of different cable materials is considered. The voltage output is produced by the addition of three thermocouple voltages. A floating reference junction, where the temperature is measured by a resistance thermometer, is used. The thermal plane is a commercially available uniform temperature reference box with a capacity of 60 thermocouple channels. Readout is by on-line computer. The equivalent resultant accuracy is 0.5 deg up to 480 deg. The use of connectors and sliprings in thermocouple circuits is also discussed. Author (ESA)

N83-29671# Universite Catholique de Louvain (Belgium). Lab. de Telecommunications et d'Hyperfrequence.
DEFINITION OF STANDARDS AND METHODS OF CALIBRATING FOR IMAGING MICROWAVE RADIOMETERS (IMR) [DEFINITION D'ETALONS ET DE METHODES D'ETALONNAGE POUR L'IMR]
J. M. Adant, P. Delogne, and A. vanderVorst Paris ESA Mar. 1982 48 p refs In FRENCH
(Contract ESA-4615/81/F-DD(SC))
(ESA-CR(P)-1724) Avail: NTIS HC A03/MF A01

Two extremely high frequency (23.8 and 36.5 GHz) noise sources, cooled by liquid nitrogen, with passband frequency = 1 GHz, were developed for IMR calibration. Error analysis shows that maximum peak error is + or - 0.21 K for the 23.8 GHz source, + or - 0.4 K for the 36.5 GHz source, with maximum probable error + or - 0.13 and + or - 0.22 K respectively. Functional autonomy is assured by regulating the level of liquid nitrogen. Author (ESA)

N83-29672# National Bureau of Standards, Washington, D.C.
SEMICONDUCTOR MEASUREMENT TECHNOLOGY: GRAPHICAL SOLUTION FOR THE HELIUM LEAK DETECTOR AND RADIOISOTOPE METHODS OF HERMETIC TEST, MASTER GRAPHS AND INSTRUCTIONS Final Report
Stanley Ruthberg Nov. 1982 40 p refs
(PB83-146845; NBS-SP-400-73; LC-82-600626) Avail: NTIS HC A03/MF A01 CSCL 14B

A graphical procedure for solution of the molecular flow approximation for the back pressurization method of hermetic test makes use of a set of characteristic curves and a test line. The

characteristic curves are appropriate for both the helium leak detector and the radioisotope methods of test, although the form of the test line differs between the two methods. Master graphs of the characteristic curves and test lines are now provided in a scale and format appropriate for producing suitable worksheets with a copier. Step by step instructions are given for their use in obtaining solutions for various examples relative to the test specifications in acceptance standards such as MIL-STD 883B, etc. GRA

N83-29673# National Bureau of Standards, Washington, D.C.
DEVELOPMENT OF THE CONE CALORIMETER, A BENCH SCALE HEAT RELEASE RATE APPARATUS BASED ON OXYGEN CONSUMPTION
Vytenis Babrauskas Nov. 1982 86 p refs
(PB83-151266; NBSIR-82-2611) Avail: NTIS HC A05/MF A01 CSCL 14B

A new bench scale rate of heat release calorimeter utilizing the oxygen consumption principle was developed for use in fire testing and research. Specimens may be of uniform or composite construction and may be tested in a horizontal, face up orientation, or, for ones which do not melt, also vertically oriented. An external irradiance of zero to over 100 kW/sq m is imposed by means of a temperature controlled radiant heater. The rate of heat release is determined by measuring combustion product gas flow and oxygen depletion, while the mass loss is simultaneously recorded directly. The instrument was designed to be capable of higher accuracy than existing instruments and yet to be simple to operate and moderate in construction cost. GRA

N83-29674# Agfa-Gevaert A.G., Munich (West Germany).
AUTOMATIC FOCUSSING DEVICES FOR PHOTOGRAPHIC CAMERAS
Klaus Birgmeier and August Hell Sep. 1980 87 p Transl. into ENGLISH of the mono. "Automatische Fokussleiverfahren fuer Fotografische Aufnahmegerate" West Germany, Sep. 1980 112 p Original language document was announced as N81-24420
(PB83-155275; BMFT-FB-T-80-103) Avail: NTIS HC A05/MF A01 CSCL 14E

High-aperture cameras and photography under poor light conditions make focussing with conventional methods very difficult. Hence, the need for autofocussing systems. Initial requirements for autofocussing systems for both still and cine cameras were defined and active and passive systems examined. In particular, optimizing rules were derived for passive autofocussing systems using contrast-measurement methods or auto-correlation based on image scanning, these rules being used in the development of related models. As regards the active autofocussing systems, working models employing triangulation with infrared light sources and ultra-sonic-wave reflection times were constructed.
Author (GRA)

N83-29675# National Bureau of Standards, Washington, D.C. National Engineering Lab.
SEMICONDUCTOR TECHNOLOGY PROGRAM PROGRESS BRIEFS Interim Report, 1 Jul. 1981 - 30 Sep. 1982
E. J. Walters Jan. 1983 21 p Sponsored in part by DOE, DARPA, DNA, Naval Weapons Support Center, Midwest Research Inst., Department of the Army, Department of the Air Force and Harry Diamond Labs.
(PB83-165043; NBSIR-82-2636) Avail: NTIS HC A02/MF A01 CSCL 14B

Abstracts of publications on measurement technology for semiconductor materials, process control, and devices are provided. Emphasis is placed on silicon and silicon-based devices. Topics include: defects and impurities, IC test structures, micrometrology, packaging, physical analysis, power devices, process and device modeling, and radiation effects. In addition, publications in press and conference presentations are listed. Information is also given on seminars, workshops, and symposia and those scheduled. GRA

N83-29676# INFOCOM, Crawley (England).
FOREIGN TECHNOLOGY ALERT-BIBLIOGRAPHY: PHOTOGRAPHY AND RECORDING DEVICES. CITATIONS FROM THE NTIS DATA BASE Final Report, Jan. 1980 - May 1982
G. Wilkinson 1982 23 p
(PB83-101626; INFO-FT/82-06) Avail: NTIS HC A02/MF A01 CSCL 14E

A systematically organized collection of abstracts from a bibliographic data base is provided on reports relating to photographic, imaging and recording systems originating from countries outside the USA. A tailored search of the data base was performed and the output carefully categorized, edited and indexed. Subjects covered include: photographic devices and imaging systems (cameras, image carriers, holography and applications); audiovisual recording (digital, magnetic and video); date encoding, recording and storage; and satellite equipment. Each of the sections in the book is cross-referenced and there is also an author index and useful suject index based on major descriptors. GRA

N83-29677# Institution of Engineers, New Delhi (India).
PROCEEDINGS OF THE IFAC SYMPOSIUM ON THEORY AND APPLICATION OF DIGITAL CONTROL. VOLUME 1: DISCUSSION PAPERS
Jan. 1982 404 p refs Symp. held at New Delhi, 5-7 Jan. 1982 Prepared in cooperation with Indian Inst. of Technology, New Delhi, India 2 Vol.
(PB83-163923) Avail: NTIS HC A18/MF A01 CSCL 14B

The tremendous tasks and challenges faced by the engineers working in the developing countries was the main thrust of discussions. Fuzzy information and decision processes: new application fields of digial control; digital control in space application; large scale systems; system identification; optimal control of discrete time systems; biomedical modelling; and microprocessor application in digital control are discussed. GRA

N83-29678# Institution of Engineers, New Delhi (India).
PROCEEDINGS OF THE IFAC SYMPOSIUM ON THEORY AND APPLICATION OF DIGITAL CONTROL. VOLUME 2: DISCUSSION PAPERS
Jan. 1982 486 p refs Symp. held at New Delhi, 5-7 Jan. 1982 Prepared in cooperation with the Indian Inst. of Technology, New Delhi, India 2 Vol.
(PB83-163931) Avail: NTIS HC A21/MF A01 CSCL 14B

The tremendous tasks and challenges faced by the engineers working in the developing countries was the main thrust of discussions. Clustering and pattern recognition; model order reduction; system identification; digital signal processing; modelling and control of socio-economic systems digital control systems; large scale systems; digital adaptive control; nonlinear estimation; and computer-aided design were discussed. GRA

N83-29679# National Bureau of Standards, Washington, D.C. Center for Analytical Chemistry.
NBS PORTABLE AMBIENT PARTICULATE SAMPLER Final Report
Robert A. Fletcher and David S. Bright Nov. 1982 44 p refs Sponsored in part by the Environmental Monitoring Systems Lab.
(PB83-165019; NBSIR-82-2561) Avail: NTIS HC A03/MF A01 CSCL 14B

The NBS portable ambient particulate sampler which is designed to collect the respirable and inhalable particle size fractions at a sampling rate of 6 L/min for 24 hour sampling periods is described. Particulates are fractionated and collected by series filtration. The collection efficiency of the inlet is measured by comparison with isokinetic probes in the wind tunnel. The collection efficiency and sampling size characteristics of two small personal cyclone samplers are also reported. GRA

36 LASERS AND MASERS

Includes parametric amplifiers.

N83-29680* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
DUAL LASER OPTICAL SYSTEM AND METHOD FOR STUDYING FLUID FLOW Patent
Robert B. Owen and William K. Witherow, inventors (to NASA) Issued 5 Jul. 1983 4 p Filed 12 Jan. 1981 Supersedes N81-19440 (19 - 10, p 1351)
(NASA-Case-MFS-25315-1; US-Patent-4,391,518; US-Patent-Appl-SN-224232; US-Patent-Case-356-129) Avail: US Patent and Trademark Office CSCL 20E

A dual laser optical system and method is disclosed for visualization of phenomena in transport substances which induce refractive index gradients such as fluid flow and pressure and temperature gradients in fluids and gases. Two images representing mutually perpendicular components of refractive index gradients may be viewed simultaneously on screen. Two lasers having wave lengths in the visible range but separated by about 1000 angstroms are utilized to provide beams which are collimated into a beam containing components of the different wave lengths. The collimated beam is passed through a test volume of the transparent substance. The collimated beam is then separated into components of the different wave lengths and focused onto a pair of knife edges arranged mutually perpendicular to produce and project images onto the screen.
Official Gazette of the U.S. Patent and Trademark Office

N83-29681*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
GEODETIC DISTANCE MEASURING APPARATUS Patent Application
James B. Abshire, inventor (to NASA) Filed 7 Apr. 1983 21 p (NASA-Case-GSC-12609-2; US-Patent-Appl-SN-481020) Avail: NTIS HC A02/MF A01 CSCL 20E

A mode locked laser system including a laser device and its peripheral components is utilized for deriving two mutually phase locked optical wavelength signals and one phase locked microwave CW signal which respectively traverse the same distance measurement path. Preferably the optical signals are comprised of pulse type signals. Phase comparison of the two optical wavelength pulse signals is used to provide a measure of the dry air density while phase comparison of one of the optical wavelength pulse signals and the microwave CW signal is used to provide a measure of the wet or water vapor density of the air. From these measurements is computed in means of the distance to be measured corrected for the atmospheric dry and water vapor densities in the measurement path. NASA

N83-29682# General Electric Co., Syracuse, N.Y. Electronics Lab.
HETERODYNE DETECTOR/ELECTRONICS DESIGN AND ALIGNMENT OF A PULSED CO2 LASER WIND SYSTEM
G. B. Jacobs Hanscom AFB, Mass. AFGL Nov. 1982 55 p ref
(Contract F19628-80-C-0184; AF Proj. 6670)
(AD-A126264; AFGL-TR-82-0348; SR-2) Avail: NTIS HC A04/MF A01 CSCL 17/5

Ten-micron heterodyne laser radar offers a new type of remote sensor that can add significantly to our characterization and understanding of the atmosphere. For example, accurate range-resolved measurements of air velocity via the Doppler of aerosol backscatter to distances of tens of kilometers will yield a better understanding of wind shear. This report describes the design of the main TEA laser E-beam modulator and of the electronics systems used for AFC stabilization of the laser frequency, and for matching IR detector outputs to the power and Doppler velocity data channels. Practical details are provided for the alignment of the complex optical system used in this laser wind sensor. GRA

N83-29683# Naval Air Development Center, Warminster, Pa. Sensors and Avionics Technology Directorate.
SOLID-STATE LASERS FOR BATHYMETRY AND COMMUNICATIONS. STUDIES OF FOUR RARE-EARTH MATERIALS Final Report, Oct. 1979 - Sep. 1981
Michael B. Rankin, Gerald D. Ferguson, and Stephen R. Bazow 3 Jan. 1983 69 p refs
(ZR01107)
(AD-A126098; NADC-83009-30) Avail: NTIS HC A04/MF A01 CSCL 20/5

Lasing transitions of four rare-earth ions in crystalline hosts were investigated for use in laser bathymetry and strategic communications systems. Transitions in Nd:YAG Li Ho F4 were studied theoretically and experimentally from 210K to 273K. At 210K the Nd transition produced 42 mj of energy when pumped by a krypton lamp with 32 joules of energy. The stimulated emission cross-section of the transition in Li Ho F4 was found to be 4 to the -20 power sq cm. The lasing threshold of a 5 mm x 75 mm Hi Ho F4 rod exceeded 50 joules at 210K. Lasing was not observed in this material. The cross-section of the 5D(4) yields 7F(5) transition (545 mm) in Li Tb F4 was measured as .16 x 10 to the -20th power sq. cm at 77K. The cross-section of the 4S(3/2) yields (15/2) transition (550 nm) in Er: Li YF4 was measured as 5 x 10 to the -20th power sq cm at 77K. A first-order analysis of the efficiency of refrigerated solid-state lasers is presented. The frequency-doubled Nd:YAG at 532 nm appears more efficient than any of the transitions studied in this work. GRA

N83-29684# Naval Research Lab., Washington, D. C. Plasma Theory Branch.
START-UP OF A PULSED BEAM FREE ELECTRON LASER (FEL) OSCILLATOR Interim Report
P. Sprangle, C. M. Tang, and Ira B. Bernstein (Yale Univ.) 1 Apr. 1983 16 p refs
(DARPA Order 3817)
(AD-A126306; NRL-MR-5011) Avail: NTIS HC A02/MF A01 CSCL 20/5

A one-dimensional linear analysis is presented of the start-up of an FEL oscillator. The model treats electron beam pulses of arbitrary shape and many significant three dimensional effects are included heuristically. A closed equation is derived for the ensemble averaged electromagnetic energy density matrix which contains the spontaneous emission as a source, and which represents the small gain per pass and losses via coefficient matrices. Numerical solutions are compared with the Stanford experimental results.
Author (GRA)

N83-29685# Cornell Univ., Ithaca, N. Y. Lab. of Atomic and Solid State Physics.
SEARCH FOR FAR INFRARED RADIATION FROM OPTICALLY PUMPED DEFECT MODES Final Technical Report, 3 Sep. 1979 - 31 Dec. 1982
A. J. Sievers 9 Feb. 1983 46 p refs
(Contract DAAG29-79-C-0170)
(AD-A125940; ARO-16513.6-PH) Avail: NTIS HC A03/MF A01 CSCL 20/5

The vibrational relaxation dynamics of a spherical top molecule embedded in alkali halide crystals have been investigated under conditions of non-equilibrium IR laser excitation. Incoherent laser saturation and high resolution hole burning spectroscopy have been used to measure the anharmonic decay of the excited vibrational state. In addition persistent IR spectral holes (with lifetimes greater than 10 minutes at 1.4 degrees K) have been observed, indicating for the first time the presence of ground state optical pumping processes for a high symmetry impurity in a cubic lattice. Our discoveries of long-lived vibrational modes in alkali halide crystals points to a new avenue of research on the physics of solids and also supports the premise that IR optical pumping can occur in the vibrational mode spectrum of a solid. GRA

N83-29686# Defense Intelligence Agency, Washington, D.C. Directorate for Scientific and Technical Intelligence.
BIBLIOGRAPHY OF SOVIET LASER DEVELOPMENTS, NO. 55,

SEPTEMBER - OCTOBER 1981
Jan. 1983 115 p
(AD-A126022; DST-2700Z-001-83) Avail: NTIS HC A06/MF A01 CSCL 20/5

This is the Soviet Laser Bibliography for September-October 1981, and is No. 55 in a continuing series on Soviet laser developments. The coverage includes basic research on solid state, liquid, gas, and chemical lasers; components; nonlinear optics; spectroscopy of laser materials; crystal growing; theoretical aspects of advanced lasers; and general laser theory. Laser applications are listed under biological effects; communications; beam propagation; computer technology; holography; laser-induced chemical reactions; measurement of laser parameters; laser measurement applications; laser-excited optical effects; laser spectroscopy; beam-target interaction, and plasma generation and diagnostics. Author (GRA)

N83-29687# Defense Intelligence Agency, Washington, D.C. Directorate for Scientific and Technical Intelligence.
BIBLIOGRAPHY OF SOVIET LASER DEVELOPMENTS, NO. 56, NOVEMBER - DECEMBER 1981
Feb. 1983 207 p
(AD-A126023; DST-2700Z-002-83) Avail: NTIS HC A10/MF A01 CSCL 20/5

This is the Soviet Laser Bibliography for November-December 1981, and is No. 56 in a continuing series on Soviet laser developments. The coverage includes basic research on solid state, liquid, gas, and chemical lasers; components; nonlinear optics; spectroscopy of laser materials; ultrashort pulse generation; crystal growing; theoretical aspects of advanced lasers; and general laser theory. Laser applications are listed under biological effects; communications; beam propagation; computer technology; holography; laser-induced chemical reactions; measurement of laser parameters; laser measurement applications; laser-excited optical effects; laser spectroscopy; beam-target interaction; and plasma generation and diagnostics. Author (GRA)

N83-29688# University of Southern California, Los Angeles. Dept. of EE, Physics and Chemistry.
KINETIC STUDIES OF GAS PHASE FREE RADICALS Final Report, 1 Oct. 1978 - 30 Sep. 1982
Curt Wittig and Hanna Reisler 30 Nov. 1982 123 p refs
(Grant AF-AFOSR-3693-78; AF Proj. 2303)
(AD-A125516; AFOSR-83-0009TR) Avail: NTIS HC A06/MF A01 CSCL 20/5

Detailed studies of elementary unimolecular and bimolecular gas phase processes were carried out using the time resolved techniques of laser photolysis and laser induced fluorescence. Bimolecular reactions of diatomic and triatomic carbon and the ethynyl radical with small polyatomic molecules were investigated, and rate coefficients and energy disposal into product degrees of freedom were determined. The study of unimolecular reactions induced by multiple photon excitation concentrated on simple bond fission reactions. Nascent rovibronic state distributions in the dissociation products of trifluorcacetonitrile were determined as a function of laser fluence and intensity. The rate of the unimolecular reaction of 2-methyl-2-nitrosopropane was measured following dye laser excitation, and found to be faster than the rate deduced from thermal activation experiments. Author (GRA)

N83-29689# Oklahoma State Univ., Stillwater. Dept. of Physics.
SPECTROSCOPIC INVESTIGATIONS OF MATERIALS FOR TUNABLE INFRARED LASERS Annual Progress Report, 1 Mar. 1982 - 28 Feb. 1983
Richard C. Powell 28 Feb. 1983 5 p
(Contract N00014-82-K-0109; NR Proj. 379-053)
(AD-A125538; APR-1) Avail: NTIS HC A02/MF A01 CSCL 20/5

Research on crystal growth and spectroscopic properties of 4d and 5d transition metal ions in halide and oxide host materials was described. Problems encountered with getting the doping material in the halide crystals are discussed. The spectra of Rh(3+) in oxide hosts are compared to well known Cr(3+) spectra. Author

N83-29690# New Mexico Univ., Albuquerque. Inst. for Modern Optics.
INVESTIGATIONS OF VACUUM ULTRAVIOLET AND SOFT X-RAY LASERS Annual Report, 15 May 1981 - 14 May 1982
Kai Druehl, Weng W. Chow, and Marlan C. Scully Nov. 1982 29 p refs
(Grant AF-AFOSR-0128-81; AF Proj. 2301)
(AD-A125558; AFOSR-83-0054TR) Avail: NTIS HC A03/MF A01 CSCL 20/5

A kinematical model which incorporates charge exchange, electron impact ionization of target and plasma screening was developed for a clashing beam charge exchange X-ray laser. Analytic results were obtained, which lead to a better understanding of the basic physical mechanisms and their dependence on cross sections and initial conditions. Author (GRA)

N83-29691# Aerospace Corp., El Segundo, Calif. Aerophysics Lab.
PERFORMANCE OF LASER BEAM WAVEFRONT SENSOR
C. P. Wang 1 Feb. 1983 35 p refs
(Contract F04701-82-C-0083)
(AD-A125432; TR-0083(3725)-1; SD-TR-83-04) Avail: NTIS HC A03/MF A01 CSCL 20/5

Laser beam wavefront measurement is important for laser beam quality evaluation and beam control. Reported in this paper is a laser beam wavefront sensor consisting of a phase detector and a scanner. With the use of this sensor, the wavefront phase profile across a laser beam has been obtained. The major advantages of this technique are that it is fast, sensitive, and compact. Other features are electric scanning, self-alignment, noise cancellation, and no drift. Wavefront sensor operational principles, features, and experimental results are presented. The sensitivity of the sensor was 5 deg. This sensitivity corresponds to the change of beam quality parameter, the Strehl ratio, by 1%. Hence it is a sensitive beam quality measurement technique. Author (GRA)

N83-29692# Itek Corp., Lexington, Mass.
GRATING BEAM COMBINER Final Technical Report, Jul. 1980 - Sep. 1982
Michael E. Schroeder, Kenneth D. Stumpf, and Mary A. Mullahy Griffiss AFB, N.Y. RADC Dec. 1982 85 p
(Contract F30602-80-C-0241; AF Proj. C503)
(AD-A125456; RADC-TR-82-311; REPT-82-152) Avail: NTIS HC A05/MF A01 CSCL 14/2

The fabrication, test, and analysis of a two-wave length dual-frequency beam sampling grating has been performed. Measurements of the efficiency, diffracted wavefront quality, frequency ratio, and skew are described. Analysis of the effects of nonzero skew and frequency ratio residual on its performance are presented, as well as the required process tolerances to achieve acceptably low levels of each. A laboratory demonstration confirmed the invariance of the co-boresighting of the two wavelengths with respect to tilt of the grating. Author (GRA)

N83-29693# Institute for Atmosphere Optics and Remote Sensing, Hampton, Va.
MULTIPLE SCATTERING EFFECTS IN AEROSOLS: THEORETICAL INVESTIGATIONS Progress Report, Sep. 1979 - Jul. 1981
Adarsh Deepak Aberdeen Proving Ground, Md. Army Armament Research and Development Command Dec. 1982 90 p refs
(Contract DAAK11-79-C-0100; DA Proj. 1L1-62622-A-552)
(AD-A125480; AD-E410654; ARCSL-CR-82060; IFAOSR-208) Avail: NTIS HC A05/MF A01 CSCL 20/5

This report presents the results of a theoretical investigation on the effects of multiple scattering (MS) on the propagation of laser beams through scattering media. The theoretical formulations are given for three methods, two exact and one approximate, based on the solution of the radiative transfer equation in the small angle approximation. Computer codes were developed,

optimized, and checked for consistency. The two methods are exact in the sense that the only approximation made is the small angle approximation. Using one of the exact methods, numerical results were obtained for contributions to MS due to various orders of scattering in the forward direction for various optical depths. The total MS contributions obtained by the two exact methods are shown to be in excellent agreement. The laser beam broadening due to MS by aerosols is also shown. Using the approximate method, numerical results were also obtained for MS effects as functions of detector field of view, as well as the size of the detector's aperture; namely, for the cases when it is the same size as or smaller or larger than the laser beam diameter. The contrast between the on-axis intensity and the received power is shown for the last three cases. GRA

N83-29694# Mission Research Corp., Alexandria, Va.
MICROWAVE CONDITIONED dc DISCHARGES FOR EXCITATION OF RARE-GAS-HALIDE LASERS
W. M. Bollen, C. P. Christensen (Potomac Photonics Corp.), R. W. Waynant (NRL), and R. L. Burnham (NRL) Dec. 1982 18 p refs
(Contract N00014-82-C-2257)
(AD-A126222; MRC/WDC-R-048) Avail: NTIS HC A02/MF A01 CSCL 20/5

Discharge-pumped rare-gas halide (RGH) lasers have undergone extensive development during the last five years. Applications of these lasers in systems requiring pulse energies of several joules and repetition rates of up to one kilohertz are now under consideration. Yet there remain several unsolved problems with discharge-pumped RGH lasers which limit their applicability in systems requiring long operating lifetimes. The switch used to control the current applied to the discharge is one of these problems. Other problem areas include impurities, which can reduce the performance of RGH lasers, and stable operation, which requires a good preionization scheme. A number of approaches to solve these problems are under investigation. In the following report we outline in more detail the nature of these problems. We discuss possible solutions based on microwave excited discharge technology and actual experiments that have been performed applying these methods. The application of microwave techniques to RGH laser technology is particularly appealing because of the advanced state of microwave devices. High-power (multiple megawatt) sources in the 1-10 GHa range with microsecond pulse lengths and kilohertz repetition rates are available. Experimental devices have demonstrated gigawatt power levels. Transport of these high-power levels can be accomplished using standard techniques. Author (GRA)

N83-29695# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
SELECTION OF REPETITION FREQUENCIES FOR LASER RANGEFINDERS
Chengguan Zhang 27 Jan. 1983 15 p refs Transl. into ENGLISH from Binggong Xuebao (Communist China), no. 2, May 1982 p 34-41
(AD-A126188; FTD-ID(RS)T-1342-82) Avail: NTIS HC A02/MF A01 CSCL 20/5

Methods for determining repetition frequencies for laser rangefinders are presented. Using these methods, repetition frequencies for air to air, air to ground, and ground to air rangefinders are correctly selected. Author

N83-29696# Rochester Univ., N. Y. Dept. of Chemistry.
QUANTUM DYNAMICAL MODEL FOR LASER EXCITATION OF A TWO-LEVEL ADATOM: SURFACE-DRESSED BLOCH EQUATIONS Interim Technical Report
Jui-Teng Lin (NRL), Xi-Yi Huang (Academia Sinica), and Thomas F. George Mar. 1983 15 p refs Submitted for publication
(Contract N00014-80-C-0472; Grant AF-AFOSR-0046-82; NR Proj. 056-746)
(AD-A126201; UROCHESTER/DC/83/TR-31) Avail: NTIS HC A02/MF A01 CSCL 20/5

Surface-dressed Bloch equations are derived from a microscopic Hamiltonian which includes the interactions among an adatom, the laser photon and the phonon modes. The influence of the surface of the population inversion of the adatom is analyzed in terms of: (1) the reflected-field-induced damping factor which depends on the orientation of the transition dipole and the adatom-surface separation and (2) the frequency shift and damping factor induced by the phonon modes. Author (GRA)

N83-29697# Rochester Univ., N. Y. Dept. of Chemistry.
THEORY OF REACTIONS AT A SOLID SURFACE
Thomas F. George, Ki-Tung Lee, William C. Murphy, Michael Hutchinson, Hai-Woong Lee (Oakland Univ., Rochester, Mich.), and Michael Baer, ed. Mar. 1983 75 p refs Submitted for publication
(Contract N00014-80-C-0472; Grants AF-AFOSR-0046-82; NSF CHE-80-22874; NR Proj. 056-749)
(AD-A126202; UROCHESTER/DC-83-TR-30; TR-30) Avail: NTIS HC A04/MF A01 CSCL 20/5

Theories and computational procedures are reviewed for processes involving bond breaking and formation at a solid surface. These processes include reactive scattering, recombination, adsorption and desorption. The article ends with a discussion of theoretical techniques for describing how some of the above processes are induced or modified by laser radiation. GRA

N83-29698# California Univ., Livermore. Lawrence Livermore Lab.
SOME SIGNAL-PROCESSING ISSUES IN RADAR-TARGET IDENTIFICATION
E. K. Miller 1 Sep. 1982 6 p Presented at the Topical Meeting on Opt. Tech. for Remote Probing of the Atmosphere, Incline Village, Nev., 10 Jan. 1983
(Contract W-7405-eng-48)
(DE83-006554; UCRL-88105; CONF-830109-2) Avail: NTIS HC A02/MF A01

Three issues in radar target identification are discussed: (1) the performance characteristics of Prony-like signal processing for estimating EM features, from the viewpoint of an input-output information transformation; (2) pole (and singularity) sets of EM features obtained from computed EM data for several situations; (3) some initial results of using frequency domain poles for target identification. It is demonstrated for data similar to that which occurs in sampling EM fields, that Prony's Method seems to preserve information, that give poles values whose accuracy on the average equals the accuracy of the input data. However, the imaginary (oscillation) components are almost always found with greater accuracy than the real (decay) components, whose accuracy seems more closely correlated to that of the predictor coefficients. The richness of the pole-based representation for EM problems is shown by giving sample results from transient data, linear-array patterns, and plane wave scattering from a half space. Finally, various target identification schemes using frequency domain poles is compared as a function of signal to noise level, with the tentative findng that improved performance seems to occur at the expense of increased computational effort. DOE

N83-29699# Argonne National Lab., Ill.
HIGH-RESOLUTION LASER AND rf SPECTROSCOPY OF ATOMIC AND MOLECULAR BEAMS
W. J. Childs, David R. Cok, and L. S. Goodman 1982 4 p Presented at the DOE Atomic Phys. Program Contr. Workshop, Williamsburg, Va., 20 May 1982
(Contract W-31-109-eng-38)
(DE83-008942; CONF-8205177-1) Avail: NTIS HC A02/MF A01

The hyperfine (hfs) and spin rotation interactions in the calcium monohalide family of radicals were studied. The systematic high precision measurements will ultimately enable theorists to test the quality of wave functions obtained in ab initio calculations of the structure of these small molecules. DOE

N83-29700# California Univ., Livermore. Lawrence Livermore Lab.
LASERS IN CHEMICAL PROCESSING

J. I. Davis 15 Apr. 1982 25 p refs
(Contract W-7405-eng-48)
(DE82-016134; UCRL-53276) Avail: NTIS HC A02/MF A01

The high cost of laser energy is the crucial issue in any potential laser processing application. It is expensive relative to other forms of energy and to most bulk chemicals. Those factors that have frustrated attempts to find commercially viable laser induced processes for the production of materials are shown. Having identified the general criteria to be satisfied to be satisfied by an economically successful laser process and shown how these imply the laser system requirements, a status report on the uranium laser isotope separation (LIS) program is presented. DOE

N83-29701# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.
NEW PULSED FAR INFRARED LASER LINES IN D2O
G. Dodel and N. G. Douglas Oct. 1982 6 p refs Submitted for publication
(IPF-82-13) Avail: NTIS HC A02/MF A01

Eleven far infrared laser transitions were obtained by pumping a D2O oscillator with the 9P(12), 9P(18), 9P(44) and 10R(22) line radiation of a TEA-CO2-laser. The efficiency of two of the lines is comparable to that of the strongest known lines in D2O.
Author (ESA)

N83-29702# National Bureau of Standards, Washington, D.C. National Engineering Lab.
BEAM-PROFILE MEASUREMENT OF LASER PULSES USING A SPATIAL FILTER TO SAMPLE THE HERMITE MODES FOR A STRING OF PULSES
Eric G. Johnson, Jr. Sep. 1982 47 p
(PB83-156612; NBS-TN-1057) Avail: NTIS HC A03/MF A01 CSCL 20F

As a first step in the development of a beam profile measuring instrument for laser source that is capable of determining the distribution of low order (less than 25) Hermitian modes in a series of laser pulses, three key parts of such an instrument were designed and evaluated. First, there is the telescope system which allows the incident laser beam to be phase, beamwidth, and beam center matched to the optical spatial filter. Second, there is a brief error analysis of the structure of the mismatch function between the beam out of the telescope and that expected by the filter. GRA

N83-29703# National Bureau of Standards, Washington, D.C. National Engineering Lab.
A SYSTEM FOR MEASURING ENERGY AND PEAK POWER OF LOW-LEVEL 1.064 MICROMETER LASER PULSES
A. A. Sanders and A. L. Rasmussen Oct. 1982 46 p refs
(PB83-165027; NBS-TN-1058) Avail: NTIS HC A03/MF A01 CSCL 14B

For the first time, transfer standards were developed for measuring 1.064 micrometer laser pulses of duration about 10 to 100 ns, peak irradiance of about 10 to the -8th power - 10 to the -4th power W/sq cm, and fluences of about 10 to the -16th power - 10 to the -11th power J/sq cm. These energy and power measurement devices use PIN and APD silicon detectors, respectively, and can be used as stable transfer standards with total uncertainties (random errors computed at the 95 percent confidence level) of 10 to 15 percent. The system for calibrating these transfer standards is also described and consists of a CW Nd:YAG laser beam acousto-optically modulated to provide low level laser pulses of known peak power and energy. A detailed evaluation of systematic and random errors is also shown. GRA

N83-29704# National Academy of Sciences - National Research Council, Washington, D. C. Solid State Sciences Committee.
THE FREE ELECTRON LASER: A RESOURCE PAPER Final Report
Jul. 1982 43 p refs
(Contract DE-FG02-81ER-10844; Grant NSF EMR-81-19500)
(PB83-148931; NSF-DMR81-19500) Avail: NTIS HC A03/MF A01 CSCL 20E

Advances in the science and technology of new sources of tunable radiation will be essential to obtaining increased and deeper understanding of gaseous and condensed state materials. The free electron laser, promises to be a unique source in the region of wavelength shorter than 200 nm and longer than 25 micrometers. The characteristics of the FEL include tunabilfty, high average power, potentially stable output power and frequency, very short pulses with high peak powers, coherence, and narrow bandwidth. The combination of these characteristics allows studies in the areas of condensed matter physics, spectroscopy of atoms, molecules and ions, and surface studies in presence of absorbed molecular species. GRA

N83-29705# National Bureau of Standards, Washington, D.C. National Engineering Lab.
BEAM-PROFILE MEASUREMENT OF LASER PULSES USING A SPATIAL FILTER TO SAMPLE THE HERMITE MODES FOR A STRING OF PULSES
Eric G. Johnson, Jr. Sep. 1982 47 p refs
(PB83-164996; NBS-TN-1057) Avail: NTIS HC A03/MF A01 CSCL 20E

A beam profile measuring instrument for laser sources that is capable of determining the distribution of low-order Hermitian modes in a series of laser pulses was developed. The telescope system allows the incident laser beam to be phase, beamwidth, and beam center matched to the optical spatial filter. An error analysis of the structure of the mismatch function between the beam out of the telescope and that expected by the filter. An analysis and design of the computer generated spatial filter that will cause the incident laser beam to be cross correlated with the low order Hermite modes and will create an array of light spots in the detector (Fourier transform) plane each of which can be uniquely related to a particular Hermite mode of the original laser pulse is presented. It is concluded that the Hermite mode analysis can be done with better than 99% separation between modes, provided the phase between modes is uncorrelated from pulse to pulse when the filter is fabricated with a two level, gray scale structure which samples the profile with either 0%, or 100% transmission. GRA

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N83-29706*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DAZE FASTENERS Patent Application
L. Robert Jackson, Randall C. Davis, and Allan H. Taylor, inventors (to NASA) Filed 17 May 1983 18 p
(NASA-Case-LAR-13009-1; US-Patent-Appl-SN-495380) Avail: NTIS HC A02/MF A01 CSCL 13E

A daze fastener system is disclosed for connecting two or more structural elements wherein the structural elements and fastener parts have substantially different coefficient of thermal expansion physical property characteristics. By providing frusto-conical abutting surfaces between the structural elements and fastener parts, any differences in thermal expansion/contraction between the parts is translated to sliding motion and avoids deleterious thermal stresses in the connection. An essential feature for isotropic homogeneous material connections is that at least two sets of mating surfaces are required in which each set of mating surfaces has line element extensions that pass through a common point. NASA

N83-29707*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
PORTABLE 90 DEG PROOF LOADING DEVICE Patent Application
Richard G. Bird, inventor (to NASA) (Rockwell International Corp., Pittsburgh) and Leo A. Berson (Rockwell International Corp.,

Pittsburgh) Filed 3 May 1983 19 p Sponsored by NASA
(NASA-Case-MSC-20250-1; US-Patent-Appl-SN-491113) Avail: NTIS HC A02/MF A01 CSCL 13I

A hydraulically actuated device is described for applying a test load to a bearing or the like to prove the integrity of its mounting or staking within a bore in a housing such as a gear case. To accommodate limited access situations, the device is constructed in a right angle configuration in which a hydraulic cylinder applies axial pressure to a first thrust rod assembly which includes a first thrust rod through a threaded spindle driving a linearly translated cam. A cam follower wheel transfers the translation to a second thrust rod assembly which includes a horizontal shaft and a spindle within a cross-arm housing portion and a tubular housing portion. The same second thrust direction applies the bearing loading in either of two directions depending upon the shape of the interface parts. The interface parts can bear on the bearing from either side with respect to the bearing mounting structural part. NASA

N83-29708*# National Aeronautics and Space Administration. Pasadena Office, Calif.
CENTRIFUGAL-RECIPROCATING COMPRESSOR Patent Application
Walter H. Higa, inventor (to NASA) 23 Jul. 1982 27 p
(NASA-Case-NPO-14597-2; US-Patent-Appl-SN-401288) Avail: NTIS HC A03/MF A01 CSCL 13I

A centrifugal compressor includes at least one pair of cylinders arranged in coaxial alignment and supported for angular displacement about a common axis of rotation normally bisecting a common longitudinal axis of symmetry for the cylinders. The cylinders are characterized by ported closures located at the mutually remote ends thereof through which the cylinders are charged and discharged, and a pair of piston heads seated within the cylinders and supported for floating displacement in compressive strokes in response to unidirectional angular displacement imparted to the cylinders. Author

N83-29709*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
VIBRATION IN PLANETARY GEAR SYSTEMS WITH UNEQUAL PLANET STIFFNESSES
J. L. Frater, R. August, and F. B. Oswald [1982] 16 p refs Proposed for presentation at the 8th Appl. Mech. Conf., St. Louis, 19-21 Sep. 1983; sponsored by Oklahoma State Univ. Prepared in cooperation with Cleveland State Univ., Ohio
(NASA-TM-83428; E-1716; NAS 1.15:83428) Avail: NTIS HC A02/MF A01 CSCL 13I

An algorithm suitable for a minicomputer was developed for finding the natural frequencies and mode shapes of a planetary gear system which has unequal stiffnesses between the Sun/planet and planet/ring gear meshes. Mode shapes are represented in the form of graphical computer output that illustrates the lateral and rotational motion of the three coaxial gears and the planet gears. This procedure permits the analysis of gear trains utilizing nonuniform mesh conditions and user specified masses, stiffnesses, and boundary conditions. Numerical integration of the equations of motion for planetary gear systems indicates that this algorithm offers an efficient means of predicting operating speeds which may result in high dynamic tooth loads. Author

N83-29710*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THEORETICAL RESULTS FOR STARVED ELLIPTICAL CONTACTS
Bernard J. Hamrock and Duncan Dowson (Leeds Univ., England) May 1983 63 p refs Submitted for publication
(NASA-TM-81697; E-209; NAS 1.15:81697) Avail: NTIS HC A04/MF A01 CSCL 11H

Eighteen cases were used in the theoretical study of the influence of lubricant starvation on film thickness and pressure in elliptical elastohydrodynamic conjunctions. From the results a simple and important critical dimensionless inlet boundary distance at which lubricant starvation becomes significant was specified. This inlet boundary distance defines whether a fully flooded or a starved condition exists in the contact. Furthermore, it was found that the film thickness for a starved condition is written in dimensionless terms as a function of the inlet distance parameter and the film thickness for a fully flooded condition. Contour plots of pressure and film thickness in and around the contact are shown for fully flooded and starved conditions. Author

N83-29711*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EXPERIMENTAL INVESTIGATIONS OF ELASTOHYDRODYNAMIC LUBRICATION
Bernard J. Hamrock and Duncan Dowson (Leeds Univ., England) May 1983 102 p refs Repr. from Ball Bearing Lubrication, Sep. 1981
(NASA-TM-81698; E-209; NAS 1.15:81698) Avail: NTIS HC A06/MF A01 CSCL 11H

Various experimental studies of elastohydrodynamic lubrication have been reviewed. The various types of machines used in these investigations, such as the disc, two and four ball, crossed-cylinders, and crossed-axes rolling disc machine, are described. The measurement of the most important parameters, such as film shape, film thickness, pressure, temperature, and traction, is considered. Determination of the film thickness is generally the most important of these effects since it dictates the extent to which the asperities on opposing surfaces can come into contact and thus has a direct bearing on wear and fatigue failure of the contacting surfaces. Several different techniques for measuring film thickness have been described, including electrical resistance, capacitance, X-ray, optical interferometry, laser beam diffraction, strain gage, and spring dynamometer methods. An attempt has been made to describe the basic concepts and limitations of each of these techniques. These various methods have been used by individual researchers, but there is no universally acceptable technique for measuring elastohydrodynamic film thickness. Capacitance methods have provided most of the reliable data for nominal line or rectangular conjunctions, but optical interferometry has proved to be the most effective procedure for elliptical contacts. Optical interferometry has the great advantage that it reveals not only the film thickness, but also details of the film shape over the complete area of the conjunction. Author

N83-29712*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ELASTOHYDRODYNAMICS OF ELLIPTICAL CONTACTS FOR MATERIALS OF LOW ELASTIC MODULUS
Bernard J. Hamrock and Duncan Dowson (Leeds Univ.) May 1983 65 p refs Repr. from Ball Bearing Lubrication, chapter 11, Sep. 1981
(NASA-TM-81699; E-209; NAS 1.15:81699) Avail: NTIS HC A04/MF A01 CSCL 11H

The influence of the ellipticity parameter k and the dimensionless speed U, load W, and materials G parameters on minimum film thickness for materials of low elastic modulus was investigated. The ellipticity parameter was varied from 1 (a ball-on-plane configuration) to 12 (a configuration approaching a line contact); U and W were each varied by one order of magnitude. Seventeen cases were used to generate the minimum- and central-film-thickness relations. The influence of lubricant starvation on minimum film thickness in starved elliptical, elastohydrodynamic configurations was also investigated for materials of low elastic modulus. Lubricant starvation was studied simply by moving the inlet boundary closer to the center of the conjunction in the numerical solutions. Contour plots of pressure and film thickness in and around the contact were presented for both fully flooded and starved lubrication conditions. It is evident from these figures that the inlet pressure contours become less circular and closer to the edge of the Hertzian contact zone and that the film thickness decreases substantially as the serverity of starvation increases. The results presented reveal the essential features of both fully flooded and starved, elliptical, elastohydrodynamic conjunctions for materials of low elastic modulus. Author

N83-29713*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

APPLICATIONS OF FILM THICKNESS EQUATIONS

Bernard J. Hamrock and Duncan Dowson (Leeds Univ.) May 1983 108 p refs Repr. from Ball Bearing Lubrication, chapter 13, Sep. 1981

(NASA-TM-81701; E-209; NAS 1.15:81701) Avail: NTIS HC A06/MF A01 CSCL 11H

A number of applications of elastohydrodynamic film thickness expressions were considered. The motion of a steel ball over steel surfaces presenting varying degrees of conformity was examined. The equation for minimum film thickness in elliptical conjunctions under elastohydrodynamic conditions was applied to roller and ball bearings. An involute gear was also introduced, it was again found that the elliptical conjunction expression yielded a conservative estimate of the minimum film thickness. Continuously variable-speed drives like the Perbury gear, which present truly elliptical elastohydrodynamic conjunctions, are favored increasingly in mobile and static machinery. A representative elastohydrodynamic condition for this class of machinery is considered for power transmission equipment. The possibility of elastohydrodynamic films of water or oil forming between locomotive wheels and rails is examined. The important subject of traction on the railways is attracting considerable attention in various countries at the present time. The final example of a synovial joint introduced the equation developed for isoviscous-elastic regimes of lubrication. Author

N83-29714# Army Materiel Development and Readiness Command, Tobyhanna, Pa.

EVALUATION OF IN-PACKAGE PERFORMANCE OF ANTI-STATIC MATERIALS

Robert McGill Jan. 1982 26 p

(AD-A126118) Avail: NTIS HC A03/MF A01 CSCL 13/4

The test procedure initially prepared in Phase 1 and refined within this Phase 2 report has shown excellent reliability in predicting the static charge propensity of packaging materials. Although the modified sensor used in Phase 2 testing was found to be suitable for this purpose, it is not intended that this sensor design be considered as a final configuration for incorporation into a future test procedure establishment. The best of the antistatic materials (other than the conductives) proved to be all polyethylene, either in film or foam form. The most dangerous of all of the materials tested proved to be plain polypropylene foam; this material exhibited rapid static charge buildup with the associated hazards where sensitive components are exposed. There appears to be substantial hazards connected with the application of stretch films. Preliminary tests indicate sharp differences between the variety of films currently being marketed, with those containing EVA additives and PVC types representing the apparent extremes in static charge propensity (low and high). GRA

N83-29715# United Technologies Corp., South Windsor, Conn. Power Systems Div.

EVALUATION OF SYNTHETIC-FUEL-CHARACTER EFFECTS ON RICH-LEAN STATIONARY-GAS-TURBINE COMBUSTION SYSTEMS. VOLUME 1: SUBSCALE TEST PROGRAM Final Report

Thomas J. Rosfjord Feb. 1983 85 p refs

(EPRI Proj. 1898-1)

(DE83-901452; EPRI-AP-2822-VOL-1) Avail: NTIS HC A05/MF A01

The evaluation of synthetic fuel character effects on rich lean stationary gas turbine combustion systems is described. Five fuels, including No. 2 petroleum distillate fuel, SRC 2, H-coal, and EDS middle distillates and hydrotreated Paraho shale oil residual were tested in a subscale 5-inch diameter rich burn/quick quench staged rich lean combustor at conditions representative of peak, baseload, part power and off design ratings of a 30 MW industrial gas turbine. This combustor is based on the design evolved under which the rich burn/quick quench concept was developed. The fuel property data base was expanded, and the range of operating conditions were extended. A minimum NO/sub X/ emission level correlated to 15% oxygen of approximately 37 ppm (well below EPA limits) was attained for all of the fuels despite fuel bound nitrogen (FBN) levels of up to 0.75% by weight. Sensitivity of NO/sub x/ emissions to reduce rich zone residence time was found to be very small. The combustor smoke emissions at baseload conditions depended on fuel properties and ranged between an SAE *Smoke Number of 15 to 45. A test with improved fuel preparation resulted in a dramatic reduction in smoke with shale oil residual fuel from an SAE Smoke Number of 40 to 3. DOE

N83-29716# Los Alamos Scientific Lab., N. Mex.

OPERATING EXPERIENCE WITH A LIQUID-HYDROGEN FUELED BUICK AND REFUELING SYSTEM

Walter F. Stewart 1982 42 p refs Presented at the World Hydrogen Energy Conf., Pasadena, Calif., 13-17 Jun. 1982

(Contract W-7405-eng-36)

(DE82-008113; LA-UR-82-428; CONF-820605-8) Avail: NTIS HC A03/MF A01

An investigation of liquid hydrogen storage and refueling systems for vehicular applications was made. The vehicle used in the project was a 1979 Buick Century sedan with a 3.8-L displacement turbocharged V6 engine and an automobile transmission. The vehicle had a fuel economy for driving in the high altitude Los Alamos area that was equivalent to 2.4 km/L of liquid hydrogen or 8.9 km/L of gasoline on an equivalent energy basis. About 22% less energy was required using hydrogen rather than gasoline to go a given distance based on the Environmental Protection Agency estimate of 7.2 km/L of gasoline for this vehicle. At the end of the project the engine had operated for 138 h and the car driven 3633 km during the 17 months that the vehicle was operated on hydrogen. DOE

N83-29717# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.

PROCESS PARAMETER EFFECTS ON ARC PHYSICS AND HEAT FLOW IN GTAW

J. F. Key, H. B. Smartt, J. W. Chan, and M. E. McIlwain (GeoCenters, Inc., Newton Upper Falls, Mass.) 1982 21 p refs Presented at the Intern. Conf. on Welding Technol. for Energy Appl., Gatlinburg, Tenn., 16 May 1982

(Contract DE-AC07-76ID-01570)

(DE82-017269; EGG-M-07682; CONF-820544-2) Avail: NTIS HC A02/MF A01

The need for a more basic understanding of welding processes has engendered efforts to provide an experimental data base for use in weld process modeling. Work to determine interrelationships of heat source, molten pool, and weld bead geometry is described here, and the sensitivity of these interrelationships to welding variables is discussed. The effects on bead morphology of changing current, welding speed, and filler wire speed, with practical boundaries, are presented as a multivariable plot. A model of the relationship between process parameters and weld bead morphology is presented; the model involves dynamic heat and mass balances in a control volume containing the molten pool. DOE

N83-29718# General Electric Co., Schenectady, N. Y. Gas Turbine Div.

APPLICATIONS OF COMPOSITE GAS-TURBINE COMPONENTS, PHASE 1 Final Report

Lance G. Peterson, David E. Hrenecin, and Robert G. Kunkel Jul. 1982 170 p refs

(Contract DE-AC01-80ET-17005)

(DE83-006574; DOE/ET-17005/3) Avail: NTIS HC A08/MF A01

A hybrid bucket which is a gas turbine part composed of a variety of alloys bonded into one integral component is discussed. Each segment is tailored to perform a specific function with greater reliability and performance than possible with contemporary monolithic parts. Several nickel base superalloy combinations which were diffusion bonded using hot isostatic pressing (HIP) were evaluated. The technique enables large gas turbine buckets to be fabricated using materials with improved creep and low cycle fatigue life for the airfoil and greater high temperature tensile strength in the dovetail. Three directionally solidified airfoil alloys

and two powdered metal dovetail alloys are investigated which includes heat treat studies and physical metallurgy and high temperature tensile testing for all five alloys in their HIP bonded condition. In parallel with these tasks will be studies on mechanics of materials and mechanical design considerations for adapting composite bucket technology into advanced gas turbine designs. DOE

N83-29719# Foster-Miller Associates, Inc., Waltham, Mass.
DIESEL EXHAUST-GAS PURIFICATION SYSTEM
Brian J. Doherty Jul. 1982 63 p refs
(Contract DE-AC04-76DP-00789)
(DE82-019808; SAND-82-7027) Avail: NTIS HC A04/MF A01

The design of a diesel exhaust gas purification system is presented. It will provide 2000 scfm of dry, anerobic gas (essentially nitrogen) for use in air drilling operations where drill pipe corrosion is a problem, such as geothermal applications. The system is operable in the field and may be transported via highways. It will operate at ambient temperatures up to 110 F and requires no water diesel fuel is used to combust excess oxygen and to generate electricity for the system. Gas production costs, including capital amortization, operations, fuel and maintenance (for reasonable utilization) are about $1.50/100 scf. DOE

N83-29720# California Univ., Livermore. Lawrence Livermore Lab.
COMPUTER SIMULATION OF CONCRETE PENETRATION BY SHAPED-CHARGED JETS
Michael J. Murphy and Jerald M. Henderson (California Univ. at Davis) 7 Jan. 1983 12 p refs Presented at the 7th Intern. Symp. on Ballistics, Hague, 19-21 Apr. 1983
(Contract W-7405-eng-48)
(DE83-007359; UCRL-88532; CONF-830417-1) Avail: NTIS HC A02/MF A01

A unified analytical approach to the solution of the shaped-charge penetration in concrete problem has been developed and is presented. The analytical model is correlated to three types of experiments that study the shaped-charge jet-formation process and resulting penetration phenomena. Hydrodynamic finite-element analysis of the explosive detonation, liner collapse, and jet-formation process is compared to a flash X-ray experiment. Analytical predictions of the penetration-time history are compared to experiments where the penetration-time history is monitored. These experiments provide for a determination of the minimum jet velocity for penetration as a function of standoff. Finally, computer predictions of total penetration and hole profile are compared to experiments. These correlations provide for a determination of the jet energy/target hole volume constant for concrete. The method developed is shown to be valid for a broad range of shaped-charge designs in concrete targets. Preliminary investigations with other target materials show the method can be extended to predict penetration for generalized shaped-charge designs into any target as long as some basic target-material properties are known. DOE

N83-29721# Environmental Protection Agency, Ann Arbor, Mich. Control Technology Assessment and Characterization Branch.
ANALYSIS OF IN-USE FUEL ECONOMY DATA, STAGE 1
Aug. 1982 359 p
(PB83-144162; EPA/AA/CTAB/FE/82-6) Avail: NTIS HC A17/MF A01 CSCL 13F

The need for, and the background work done on adjusting the Environmental Protection Agency (EPA) miles per gallon (MPG) values to more closely correspond to actual fuel economy experience on the road are summarized. The derivation of mathematical algorithms that could be used to perform the needed adjustment is emphasized. Using an extensive data base of in-use fuel economy, algorithms are developed which depend on certain design features of motor vehicles. Substantial improvements in the accuracy of the fuel economy labeling and gas mileage programs will result when adjustments to the values are adopted. GRA

N83-29722# Southwest Research Inst., San Antonio, Tex.
EMISSION CHARACTERIZATION OF A SPARK-IGNITED, HEAVY-DUTY, DIRECT-INJECTED METHANOL ENGINE Final Report, Dec. 1981 - May 1982
Terry L. Ullman and Charles T. Hare Ann Arbor, Mich. EPA Nov. 1982 128 p refs
(Contract EPA-68-03-3073)
(PB83-156372; EPA-460/3-82-003) Avail: NTIS HC A07/MF A01 CSCL 21G

A truck size diesel engine was modified to consume only neat methanol by the addition of a transistorized spark ignition system. Regulated and unregulated exhaust emissions from this methanol engine with oxidation catalyst were characterized. Emissions characterization included regulated emissions (HC, CO, and NOx), along with unburned alcohols, aldehydes, other gaseous organics, total particulate, sulfate, soluble organic in particulate, BaP, and Ames bioactivity. Emissions from this spark ignited methanol and catalyst engine are compared to emissions from a pilot injected methanol engine and a comparable diesel engine. GRA

N83-29723# Washington Univ., Seattle.
ELASTOMERIC BEARINGS DESIGN, CONSTRUCTION AND MATERIALS Final Report
J. F. Stanton and C. W. Roeder Aug. 1982 95 p refs Sponsored in part by the Federal Highway Administration
(PB83-149211; TRB/NCHRP/REP-248; ISBN-0-309-03418-3; LC-82-50976; ISSN-0077-5614) Avail: NTIS HC A05/MF A01 CSCL 13B

A comprehensive presentation of the state of the art in the design and behavior of elastometric bearings, and it proposes modifications to the AASHTO Specification are contained. Elastomeric bearings are functional and economical. They may have a very long service life with virtually no maintenance. GRA

N83-29724# Environmental Protection Agency, Ann Arbor, Mich. Test and Evaluation Branch.
EMISSIONS AND FUEL ECONOMY OF THE KAT'S ENGINE BLOCK HEATER DEVICE
Jesse McCall Oct. 1982 14 p
(PB83-165548; EPA-AA-TEB-83-1) Avail: NTIS HC A02/MF A01 CSCL 21G

The results of testing the Kat's Engine Block Heater with respect to exhaust emissions and fuel economy at ambient temperatures of 20 degrees, 40 degrees, and 60 degrees Fahrenheit are described. This device contains an electric heating element within an open metal cylinder which is spliced into the lower radiator hose of the engine's cooling system. The primary purpose of this device is to minimize hard starting in cold weather. A secondary purpose is to improve fuel economy. Testing of three 1979 passenger cars was conducted at EPA's Motor Vehicle Emission Laboratory from December 1981 through March 1982. The test sequence used was the Federal Test Procedure (FTP). GRA

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N83-29725*# Ohio State Univ., Columbus. Dept. of Engineering Mechanics.
SCATTER OF ELASTIC WAVES BY A THIN FLAT ELLIPTICAL INHOMOGENEITY Final Report
L. S. Fu Washington NASA Jul. 1983 20 p refs
(Grant NAG-3340)
(NASA-CR-3705; NAS 1.26:3705) Avail: NTIS HC A02/MF A01 CSCL 14D

Elastodynamic fields of a single, flat, elliptical inhomogeneity embedded in an infinite elastic medium subjected to plane time harmonic waves are studied. Scattered displacement amplitudes

and stress intensities are obtained in series form for an incident wave in an arbitrary direction. The cases of a penny shaped crack and an elliptical crack are given as examples. The analysis is valid for alpha a up to about two, where alpha is longitudinal wave number and a is a typical geometric parameter. S.L.

N83-29726# Battelle Pacific Northwest Labs., Richland, Wash.
RESEARCH TO DEVELOP AND EVALUATE ADVANCED EDDY CURRENT SENSORS FOR DETECTING SMALL FLAWS IN METALLIC AEROSPACE COMPONENTS Final Technical Report, 20 Sep. 1980 - 31 Jul. 1982
James M. Prince and Bert A. Auld Wright-Patterson AFB, Ohio AFWAL Dec. 1982 101 p refs
(Contract F33615-80-C-5172; AF Proj. 2418)
(AD-A125873; AFWAL-TR-82-4155) Avail: NTIS HC A06/MF A01 CSCL 21/5

The purpose of this program was to develop a reproducible, highly sensitive novel eddy current probe applying the technique of ferromagnetic resonance (FMR). The method developed must be suited to inspect test objects where access may be limited, for example bolt holes of turbine engine disks. This program studied the FMR probe in both its passive and active modes. An active probe was developed and tested that demonstrated that the FMR technique is a practical approach for inspection of metallic aerospace components. The program consisted of three tasks. In Task 1 the theoretical analysis and modeling was performed by Stanford Universtiy under subcontract with Battelle. This analysis and modelling served as a guide in probe design concepts for Battelle's experimental evaluation, which was performed in Task 2. Finally, a demonstration, comprising Task 3, was performed for Air Force Materials Laboratory personnel at Battelle's facility in which five FMR probes of the same design were tested. The results of the demonstration confirmed the FMR probe design's reproducibility and repeatable high sensitivity for detecting flaws located in a titanium bolt-hole specimen. Author (GRA)

N83-29727# California Univ., Livermore. Lawrence Livermore Lab.
CHARACTERIZATION OF MATERIAL FLAWS USING ULTRASONIC RAMP RESPONSES
Ronald L. McKinney 14 Dec. 1982 78 p refs
(Contract W-7405-eng-48)
(DE83-006123; UCID-19656) Avail: NTIS HC A05/MF A01

A nondestructive evaluation (NDE) technique that characterizes inclusions within solids using ultrasound was validated. The technique interrogates the scatterer with stress waves pre-processed to have ramp wave shapes. Thus a ramp in time and the ramp designation is defined to mean only one abrupt change of the first derivative of the shape of the pulse. A new theory was developed because the physical optics approximation depends on the scatterer being a rigid smooth body of a generally convex shape, a condition which is not met in elastic solids. The new theory states that when a ramp waveform strikes an inclusion the backscattered wave is a product of two parts. One part contains material property changes between the host and scatterer. The other is predicted to be a mapping of the inclusions area profile as a function of line of sight distance. The shear wave ramp response is compared to the longitudinal wave ramp response which yields information concerning the material properties of the scatterer. DOE

N83-29728*# National Bureau of Standards, Washington, D.C. Center for Materials Science.
INNOVATION FOR MAINTENANCE TECHNOLOGY IMPROVEMENTS Final Report
T. Robert Shives, ed. and William A. Willard, ed. Oct. 1982 511 p Proc. of the 33rd Meeting of the Mechanical Failures Prevention Group, Gaithersburg, Md., 21-23 Apr. 1981 Sponsored in part by the Naval Systems Command, ONR and NASA. Goddard Space Flight Center
(NASA-CR-172821; NAS1.26:172821; PB83-149450 NBS-SP-640; LC-82-600598) Avail: NTIS HC A22/MF A01 CSCL 13H

A group of 34 submitted entries (32 papers and 2 abstracts) from the 33rd meeting of the Mechanical Failures Prevention Group whose subject was maintenance technology improvement through innovation. Areas of special emphasis included maintenance concepts, maintenance analysis systems, improved maintenance processes, innovative maintenance diagnostics and maintenance indicators, and technology improvements for power plant applications. GRA

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

N83-29729 Howard Univ., Washington, D. C.
ATTITUDE DYNAMICS AND STABILITY OF LARGE FLEXIBLE STRUCTURES IN ORBIT Ph.D. Thesis
Vijaya Krishna Kumar 1981 235 p
Avail: Univ. Microfilms Order No. DA8301046

The equations of motion of an arbitrary flexible body in orbit are derived. The model includes the effects of gravity with all its higher harmonics. As specific examples, the motion of some simple structures, i.e., flexible beam, flat circular plate and shallow spherical shell in orbit are analyzed. A passive gravity gradient stabilization scheme using an articulated light weight dumbbell is considered to stabilize those structures which would be gravitationally unstable in the absence of any control. The dumbbell is found to excite only antisymmetric modes in the case of the beam and axisymmetric modes in the case of the circular plate and shallow spherical shell. In addition, the shallow spherical shell is found to undergo a small static deformation under the influence of gravity and orbital motion. A parametric study of the sensitivity of the lowest frequency mode characteristics of the system at very low natural frequencies is studied in all the cases. The effects of environmental disturbances such as gravity-gradient and solar radiation on these structures are also investigated. Dissert. Abstr.

N83-29730 Virginia Polytechnic Inst. and State Univ., Blacksburg.
STRESS INTENSITY FACTOR DISTRIBUTION FOR NATURAL FLAWS GROWN UNDER MODE 1 LOADING USING 3-D PHOTOELASTICITY Ph.D. Thesis
George Cabel Kirby 1982 95 p
Avail: Univ. Microfilms Order No. DA8226900

Natural cracks were grown in plates under Mode I loading and the stress intensity factor distribution around the flaw border for such flaws was determined by using 3-D photoelasticity. The experimental results were compared with an existing finite element program. Also, the validity of self similar and semielliptical flaw growth was investigated. It was found that flows retain a semi-elliptical shape throughout flaw growth was non self similar after the flaw penetrated 0.40 through the thickness of the plate. It was also found that the finite element program flaws with a flaw depth to plate thickness ratio greater than 0.5 underpredicts the SIF at the point of deepest flaw penetration. However, for other locations around the flaw border, the agreement between experiment and the numerical solution was very good. Dissert. Abstr.

N83-29731*# Arizona Univ., Tucson. Dept. of Aerospace and Mechanical Engineering.
STATISTICAL SUMMARIES OF FATIGUE DATA FOR DESIGN PURPOSES Final Report
Paul H. Wirsching Washington, D.C. NASA Jul. 1983 63 p refs
(Grant NAG3-41)
(NASA-CR-3697; NAS 1.26:3697) Avail: NTIS HC A04/MF A01 CSCL 20K

Two methods are discussed for constructing a design curve on the safe side of fatigue data. Both the tolerance interval and

equivalent prediction interval (EPI) concepts provide such a curve while accounting for both the distribution of the estimators in small samples and the data scatter. The EPI is also useful as a mechanism for providing necessary statistics on S-N data for a full reliability analysis which includes uncertainty in all fatigue design factors. Examples of statistical analyses of the general strain life relationship are presented. The tolerance limit and EPI techniques for defining a design curve are demonstrated. Examples usng WASPALOY B and RQC-100 data demonstrate that a reliability model could be constructed by considering the fatigue strength and fatigue ductility coefficients as two independent random variables. A technique given for establishing the fatigue strength for high cycle lives relies on an extrapolation technique and also accounts for 'runners.' A reliability model or design value can be specified. Author

N83-29732*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
GROUND TEST EXPERIENCE WITH LARGE COMPOSITE STRUCTURES FOR COMMERCIAL TRANSPORTS
Herman L. Bohon, Andrew J. Chapman, III, and Herbert A. Leybold Mar. 1983 22 p refs Presented at the Am. Helicopter Soc. Composite Struct. Specialist's Conf., Philadelphia, 23-25 Mar. 1983
(NASA-TM-84627; NAS 1.15:84627) Avail: NTIS HC A02/MF A01 CSCL 20K

The initial ground test of each component resulted in structural failure at less than ultimate design loads. While such failures represent major program delays, the investigation and analysis of each failure revealed significant lessons for effective utilization of composites in primary structure. Foremost among these are secondary loads that produce through-the-thickness forces which may lead to serious weaknesses in an otherwise sound structural design. The sources, magnitude, and effects of secondary loads need to be thoroughly understood and accounted for by the designers of composite primary aircraft structures. Author

N83-29733*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ADVANCED STRUCTURES TECHNOLOGY AND AIRCRAFT SAFETY
Harvey G. McComb, Jr. Jul. 1983 16 p refs
(NASA-TM-85664; NAS 1.15:85664) Avail: NTIS HC A02/MF A01 CSCL 20K

NASA research and development on advanced aeronautical structures technology related to flight safety is reviewed. The effort is categorized as research in the technology base and projects sponsored by the Aircraft Energy Efficiency (ACEE) Project Office. Base technology research includes mechanics of composite structures, crash dynamics, and landing dynamics. The ACEE projects involve development and fabrication of selected composite structural components for existing commercial transport aircraft. Technology emanating from this research is intended to result in airframe structures with improved efficiency and safety. Author

N83-29734*# Arizona Univ., Tucson. Dept. of Aerospace and Mechanical Engineering.
APPLICATION OF ADVANCED RELIABILITY METHODS TO LOCAL STRAIN FATIGUE ANALYSIS Final Report
Tih-Tsuen Wu and Paul H. Wirsching Washington Jul. 1983 52 p refs
(Grant NAG3-41)
(NASA-CR-168198; NAS 1.26:168198) Avail: NTIS HC A04/MF A01 CSCL 20K

When design factors are considered as random variables and the failure condition cannot be expressed by a closed form algebraic inequality, computations of risk (or probability of failure) might become extremely difficult or very inefficient. This study suggests using a simple, and easily constructed, second degree polynomial to approximate the complicated limit state in the neighborhood of the design point; a computer analysis relates the design variables at selected points. Then a fast probability integration technique (i.e., the Rackwitz-Fiessler algorithm) can be used to estimate risk. The capability of the proposed method is demonstrated in an example of a low cycle fatigue problem for which a computer analysis is required to perform local strain analysis to relate the design variables. A comparison of the performance of this method is made with a far more costly Monte Carlo solution. Agreement of the proposed method with Monte Carlo is considered to be good. Author

N83-29735# Naval Research Lab., Washington, D. C.
LOAD RATIO AND ENVIRONMENTAL EFFECTS ON FATIGUE CRACK GROWTH RATES FOR SEVERAL SHIP STEELS
S. J. Gill and T. W. Crooker 5 Apr. 1983 41 p refs
(SF43422593)
(AD-A126285; NRL-MR-5046) Avail: NTIS HC A03/MF A01 CSCL 11/6

Fatigue crack growth rate tests were conducted on HY-100, high tensile steel (HS) and medium carbon ship steels. Tests were conducted in air at 5 Hz and in 3.5 percent NaCl salt water under freely corroding conditions at 0.5 Hz. Load ratios of 0.10, 0.67 and 0.80 were investigated in both environments. For data gathered in air, crack growth rates (da/dN) were insensitive to stress ratio and the data conformed to a Paris power law relationship between da/dN and stress-intensity range (delta K). Salt water exerted a minor effect on da/dN in the HS and medium carbon steels. However, in the higher strength HY-100, a combination of salt water and high load ratios accelerated crack growth rates by approximately a factor of five. Author (GRA)

N83-29736# Army Armament Research and Development Command, Watervliet, N. Y. Large Caliber Weapon Systems Lab.
STRESS INTENSITY FACTORS FOR RADIAL CRACKS IN A PRE-STRESSED, THICK-WALLED CYLINDER OF STRAIN-HARDENING MATERIALS Final Report
S. L. Pu and P. C. T. Chen Feb. 1983 36 p refs Submitted for publication
(DA Proj. 1L1-61102-AH-60)
(AD-A125552; ARLCB-TR-83003) Avail: NTIS HC A03/MF A01 CSCL 20/11

A simple method which combines the weight function technique and finite element results is used to obtain mode I stress intensity factor solutions for radially cracked cylinders subjected to a high internal pressure. The method is especially effective for cylinders having residual stresses due to a manufacturing pre-stress process to increase the maximum pressure the cylinder can contain, and to improve the cylinder's useful life against fatigue and fracture. The method is quite general for various assumptions involving the plastic stress-strain relations, the yield condition, the strain-hardening, and the compressibility of the cylinder material. Author (GRA)

N83-29737# Brown Univ., Providence, R. I. Dept. of Engineering.
PROPAGATION ELASTIC-PLASTIC FIELDS: ASYMPTOTIC ANALYSIS OF PLANE STRAIN CRACK GROWTH AND RESTRICTIONS ON MOVING SURFACES OF STRONG DISCONTINUITY Ph.D. Thesis
Walter J. Drugan May 1982 133 p
(Contract DE-AC02-80ER-10556)
(DE82-018820; DOE/ER-10556/88; TR-88) Avail: NTIS HC A07/MF A01

Elucidation of the stress and deformation fields near the tip of a quasistatically advancing plane strain tensile crack in an elastic-ideally plastic solid is discussed. DOE

N83-29738# Lehigh Univ., Bethlehem, Pa.
PRESSURE SINTERING AND CREEP DEFORMATION: A JOINT MODELING APPROACH Final Report
Michael R. Notis Jan. 1983 11 p refs
(Contract DE-AC02-76ER-12408)
(DE83-006516; DOE/ER-12408/8) Avail: NTIS HC A02/MF A01

The mechanisms and microstructure affecting hot-pressing and creep processes were examined. CoO was hot-pressed to different

porosity levels and densification maps drawn. Creep experiments were carried out on pure CoO. Dislocation structure of deformed CoO was studied. Grain growth rates in CoO changes from a square dependence with time to a cubic dependence as porosity drops below 2 to 3%. Pores tend to remain on grain boundaries during both final and intermediate-stage densification. A wide variety of ceramics were examined for segregtion of impurities: NiO-MgO, NiO-Cr2O3, NiO-TiO2, Ni-Al2O3. Precipitation processes are being studied in NiO-Cr2O3 and in magnesium aluminate spinel. DOE

N83-29739# Oak Ridge National Lab., Tenn. Computer Science Div.
APPLICATIONS OF ENERGY-RELEASE-RATE TECHNIQUES TO PART-THROUGH CRACKS IN PLATES AND CYLINDERS, VOLUME 2. ORVIRT: A FINITE ELEMENT PROGRAM FOR ENERGY RELEASE RATE CALCULATIONS FOR 2-DIMENSIONAL AND 3-DIMENSIONAL CRACK MODELS
B. R. Bass and J. W. Bryson Feb. 1983 49 p refs
(Contract W-7405-eng-26)
(DE83-007081; NUREG/ER-2997-Vol-2; ORNL/TM-8527-Vol-2) Avail: NTIS HC A03/MF A01

Certain studies of fracture phenomena, such as pressurized-thermal-shock of cracked structures, require that crack tip parameters be determined for combined thermal and mechanical loads. A method is proposed here that modifies the isothermal formulation of deLorenzi to account for thermal strains in cracked bodies. The formulation has been implemented in the virtual-crack-extension program ORVIRT (Oak Ridge VIRTual-Crack-Extension). Program ORVIRT performs energy release rate calculations for both 2- and 3-dimensional nonlinear models of crack configurations in engineering structures. Two applications of the ORVIRT program are described. In the first, semielliptical surface cracks in an experimental test vessel are analyzed under elastic-plastic conditions using the finite element method. The second application is a thick-walled test vessel subjected to combined pressure and thermal shock loading. DOE

N83-29740# Brookhaven National Lab., Upton, N. Y.
INVESTIGATION OF THE CONSERVATISM ASSOCIATED WITH DIFFERENT COMBINATIONS BETWEEN PRIMARY AND SECONDARY PIPING RESPONSES
Y. K. Wang, M. Subudhi, and P. Bezler Jan. 1983 85 p refs
(Contract DE-AC02-76CH-00016)
(DE83-007417; NUREG/CR-3086; BNL-NUREG-51629) Avail: NTIS HC A05/MF A01

This report includes the findings of an investigation of the conservatism associated with different combinations between the primary and secondary stress components for piping systems under dynamic loading, such as in an earthquake event. The primary stresses are induced by piping response to its mass inertia effects. The secondary stresses are induced by relative displacements of piping supports. The study involves an independent time history analysis of several typical piping models to predict a best estimate of the actual dynamic and pseudo-static pipe responses to an earthquake. These piping systems are also analyzed using the response spectrum method to obtain the maximum primary stress components. Secondary stresses are next calculated by performing a set of static analyses which provide the worst stress condition. The two components are then combined by both SRSS and absolute sum methods as the results are compared with time history solutions. DOE

N83-29741# Illinois Univ., Urbana. Dept. of Civil Engineering.
EFFECTS OF VARIATION IN LOAD HISTORY ON CYCLIC RESPONSE OF CONCRETE FLEXURAL MEMBERS
Tze-How Hwang and C. G. Scribner Sep. 1982 252 p refs
(Grant NSF CME-80-06711)
(PB83-153403; UILU-ENG-82-2013) Avail: NTIS HC A12/MF A01 CSCL 13M

Eleven reinforced concrete cantliver beam specimens were constructed and subjected to different load histories to study the effect of load history on the total energy dissipation capacity of flexural members under inelastic cyclic loading. Major variables included in this study were load history and maximum shear stress applied to the members. Four different load histories and three levels of maximum shear stress were used. Both variables were found to significantly affect the total amount of energy a specimen was able to dissipate prior to failure. The results of these tests indicated that, if member maximum displacement did not exceed 2 percent of its shear span length, severe deterioration of member shear strength would not take places within the number of cycles of load that a structural member could reasonably be expected to experience during a severe earthquakes. GRA

N83-29742# California Univ., Berkeley. Earthquake Engineering Research Center.
MECHANICAL BEHAVIOR OF SHEAR WALL VERTICAL BOUNDARY MEMBERS: AN EXPERIMENTAL INVESTIGATION
Maryann T. Wagner and Vitelmo V. Bertero Oct. 1982 78 p refs
(Grant NSF PFR-79-08984)
(PB83-159764; UCB/EERC-82/18) Avail: NTIS HC A05/MF A01 CSCL 13M

The behavior of confined edge members in reinforced concrete wall systems subjected to seismic excitations was formulated. Eight specially shaped concrete specimens were tested to assess the mechanical characteristics of edge members. These specimens were designed to simulate one third scale models of the edge members in a prototype 15 story, barbell shaped wall. Both monotonic and cyclic shear loading were applied in combination with axial forces to the study of both monotonic and hysteretic responses of the specimens to shear loading. Experimental results indicated that high compressive forces lead to high shear resistance accompanied by large shear stiffness. GRA

42 GEOSCIENCES (GENERAL)

N83-29743# Committee on Space Research, Berlin (East Germany).
SPACE RESEARCH ACTIVITIES IN THE GERMAN DEMOCRATIC REPUBLIC
W. Boehme and R. Knuth 1982 15 p Presented at the 24th Plenary Meeting of COSPAR, Ottawa, 1982
Avail: NTIS HC A02/MF A01

Meteorology, lower ionosphere, magnetosphere, solar physics, Earth surveys, satellite geodesy, lunar studies, material sciences and life sciences research activities are summarized. Author

N83-29744*# National Aeronautics and Space Administration, Washington, D. C.
LAND-RELATED GLOBAL HABITABILITY SCIENCE ISSUES
Jul. 1983 115 p refs
(NASA-TM-85841; NAS 1.15:85841) Avail: NTIS HC A06/MF A01 CSCL 08F

The scientific investigation of the viewpoint of the biosphere that living organisms and their physical and chemical environment are bound, inseparable parts of one set of closely coupled global processes of the global biogeochemical system, life and life support cycles, is discussed as one of the major scientific challenges of the next decade by building from understanding land processes to interdisciplinary, holistic studies of biospheric dynamics including human impacts. Author

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography.*

N83-29745*# Cornell Univ., Ithaca, N. Y. Remote Sensing Program.

REMOTE SENSING PROGRAM Summary Report, Jun. 1972 - May 1983
Warren R. Philipson, Principal Investigator Jun. 1983 23 p ERTS
(Grant NGL-33-010-171)
(E83-10304; NASA-CR-170375; NAS 1.26:170375) Avail: NTIS HC A02/MF A01 CSCL 05B

Built on Cornell's thirty years of experience in aerial photographic studies, the NASA-sponsored remote sensing program strengthened instruction and research in remote sensing, established communication links within and beyond the university community, and conducted research projects for or with town, county, state, federal, and private organizations in New York State. The 43 completed applied research projects are listed as well as 13 spinoff grants/contracts. The curriculum offered, consultations provided, and data processing facilities available are described. Publications engendered are listed including the thesis of graduates in the remote sensing program. A.R.H.

N83-29746*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SEASAT SYNTHETIC-APERTURE RADAR DATA USER'S MANUAL
Steven H. Pravdo, Bryan Huneycutt, Benjamin M. Holt, and Daniel N. Held 1 Mar. 1983 112 p refs Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(Contract NAS7-100)
(E83-10321; NASA-CR-170381; JPL-Pub-82-90; NAS 1.26:170381) Avail: NTIS HC A06/MF A01 CSCL 17I

The SEASAT Synthetic-Aperture Radar (SAR) system, the data processors, the extent of the image data set, and the means by which a user obtains this data are described and the data quality is evaluated. The user is alerted to some potential problems with the existing volume of SEASAT SAR image data, and allows him to modify his use of that data accordingly. Secondly, the manual focuses on the ultimate focuses on the ultimate capabilities of the raw data set and evaluates the potential of this data for processing into accurately located, amplitude-calibrated imagery of high resolution. This allows the user to decide whether his needs require special-purpose data processing of the SAR raw data. Author

N83-29747*# Michigan State Univ., East Lansing. Center for Remote Sensing.
USE OF REMOTE SENSING FOR LAND USE POLICY FORMULATION Annual Progress Report, 1 Jun. 1981 - 31 May 1982
31 May 1982 57 p ref Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(Grant NGL-23-004-083)
(E83-10326; NASA-CR-170384; NAS 1.26:170384) Avail: NTIS HC A04/MF A01 CSCL 08B

Research projects described include: (1) identifying coniferous forest types in Michigan using LANDSAT imagery; (2) investigating synoptic temperature patterns in Michigan as determined via GOES and HCMM thermal imagery; (3) land surface change detection using satellite data and a geographic data base; (4) determining soil map unit composition by electronic scanning densitometry; and (5) delimiting areas of virus infection in vineyards and blueberry fields in southwestern and western Michigan. Contractual activities involve important farmlands inventory, changes in aquatic vegetation in Saginaw Bay, digitized soil association map of Michigan, and aerial photography for hybrid-poplar research. On-going projects are also being conducted in Jamaica, Honduras, the Dominican Republic and Kenya. A.R.H.

N83-29748*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.
ANALYTICAL DESIGN OF MULTISPECTRAL SENSORS
D. J. Wiersma and D. A. Landgrebe Apr. 1980 11 p refs Repr. from IEEE Trans. on Geosci. and Remote Sensing, v. GE-18, no. 2, Apr. 1980 p 180-189 Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contracts NAS9-15466; NAS9-14970; Proj. AgRISTARS)
(E83-10337; NASA-CR-171663; NAS 1.26:171663; SR-P1-04163) Avail: NTIS HC A02/MF A01 CSCL 02C

An optimal design based on the criterion of minimum mean square representation error using the Karhunen-Loeve expansion was developed to represent the spectral response functions from a stratum based upon a stochastic process scene model. From the overall pattern recognition system perspective, the effect of the representation accuracy on a typical performance criterion (the probability of correct classification) is investigated. The optimum sensor design provides a standard against which practical (suboptimum) operational sensors can be compared. An example design is provided and its performance is illustrated. Although developed primarily for the purpose of sensor design, the procedure has potential for making important contributions to scene understanding. Spectral channels which have narrow bandwidths relative to current sensor systems may be necessary to provide adequate spectral representation and improved classification performance. A.R.H.

N83-29749*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
EVALUATION OF LANDSAT-4 TM AND MSS GROUND GEOMETRY PERFORMANCE WITHOUT GROUND CONTROL Quarterly Progress Report
Nevin A. Bryant and Albert L. Zobrist 20 Jun. 1983 3 p Sponsored by NASA ERTS
(E83-10338; NASA-CR-172907; NAS 1.26:172907) Avail: NTIS HC A02/MF A01 CSCL 05B

Techniques and software developed to characterize the Washington, D.C. scene were improved and are being systematically applied to an Imperial Valley, CA scene. Digital elevation files are being acquired. One hundred seventy-two tiepoints were located in the Imperial Valley scene. They were digitized from USGS maps to determine their lat-long coordinates. A least squares fit is currently being performed between line-sample image data and the lat-long positions of the tiepoints. Thematic mapper scanner sweeps were determined for the Imperial Valley P-data. VICAR jobs are currently under way to analyze sample-direction offsets between sweeps in the data, as well as band to band registration offsets. Tiepoint location is about to begin in the Harrisburg, PA scene. A.R.H.

N83-29750*# National Aeronautics and Space Administration. Earth Resources Labs., Bay St. Louis, Miss.
LITERATURE REVIEW OF ORGANIC MATTER TRANSPORT FROM MARSHES
David D. Dow May 1982 79 p refs ERTS
(E83-10352; NASA-TP-2022; NAS 1.60:2022) Avail: NTIS HC A05/MF A01 CSCL 13B

A conceptual model for estimating a transport coefficient for the movement of nonliving organic matter from wetlands to the adjacent embayments was developed in a manner that makes it compatible with the Earth Resources Laboratory's Productive Capacity Model. The model, which envisages detritus movement from wetland pixels to the nearest land-water boundary followed by movement within the water column from tidal creeks to the adjacent embayment, can be transposed to deal with only the interaction between tidal water and the marsh or to estimate the transport from embayments to the adjacent coastal waters. The outwelling hypothesis postulated wetlands as supporting coastal fisheries either by exporting nutrients, such as inorganic nitrogen, which stimulated the plankton-based grazing food chain in the water column, or through the export of dissolved and particulate organic carbon which provided a benthic, detritus-based food web which provides the food source for the grazing food chain in a more indirect fashion. A.R.H.

N83-29751*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SEASAT OBSERVATIONS OF LITHOSPHERIC FLEXURE SEAWARD OF TRENCHES
David C. McAdoo and Chreston F. Martin Jun. 1983 52 p refs ERTS
(E83-10353; NASA-TM-85046; NAS 1.15:85046) Avail: NTIS HC A04/MF A01 CSCL 05B

Lithospheric flexure seaward of deep ocean trenches in SEASAT altimeter observations of the marine geoid. In fact, mechanical models of lithospheric flexure can be tested directly on the SEASAT altimeter data. A simple elastic model was used for the oceanic lithosphere and, after least squares adjustments, estimates of model parameters were recovered including Outer Rise (OR) amplitude, OR wavelength, and effective lithospheric thickness. Effective lithospheric thickness was recovered for five regions: the Mariana, the Kuril, the Philippine, the Aleutian and the Middle America OR. These results support the suggestion of Bodine et al. (1981) that effective thickness, T, increased with age of lithosphere in approximate accord with the relation T approximately equals x age to the 1/2 power where C approximately equals 4 km x my to the -1/2 power. Altimetric results agree more closely with this relation than do published results based on bathymetric data. The close agreement with the thickness-age relation suggests that there is no longer any need to assume that significant horizontal compression acts across the Kuril, Marianas and Izo-Bonin trenches. This thickness-age relation implies that flexural strength of the oceanic lithosphere is temperature controlled. Author

N83-29752*# National Inst. for Telecommunications Research, Johannesburg (South Africa). Satellite Remote Sensing Centre.
LANDSAT IMAGERY: DESCRIPTION OF PRODUCTS AVAILABLE FROM THE CSIR SATELLITE REMOTE SENSING CENTRE
Feb. 1982 14 p Sponsored by NASA Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(E83-10354; NASA-CR-172881; NAS 1.26:172881;
ISBN-0-7988-2309-7) Avail: NTIS HC A02/MF A01 CSCL 05B

An overview of the LANDSAT system is provided along with information to assist prospective users in establishing whether imagery for their areas of interest is available and how to obtain such imagery. Spectral bands, spatial resolution, and digital data are explained as well as worldwide reference system indexing and the identification number assigned to images. The sizes and scales of standard black and white imagery and of false color composite imagery are listed. The format is given for computer compatible tapes and standard enhanced imagery is described. Other information available to users include LANDSAT index maps, catalogs of available imagery, a schedule of overpass dates, and a list of product prices. A.R.H.

N83-29753*# Pennsylvania State Univ., University Park. Inst. for Research on Land and Water Resources.
SOIL TEMPERATURE INVESTIGATIONS USING SATELLITE ACQUIRED THERMAL-INFRARED DATA IN SEMI-ARID REGIONS Thesis. Final Report
Rick L. Day and Gary W. Petersen Apr. 1983 199 p refs Original contains color imagery. Original imagery may be purchased from NASA Goddard Space Flight Center, (code 601), Greenbelt, Md. 20770. Domestic users send orders to 'Attn: National Space Science Data Center'; non-domestic users send orders to 'Attn: World Data Center A for Rockets and Satellites'. HCMM (Contract NAS5-26612)
(E83-10355; NASA-CR-172882; NAS 1.26:172882) Avail: NTIS HC A09/MF A01 CSCL 08M

Thermal-infrared data from the Heat Capacity Mapping Mission satellite were used to map the spatial distribution of diurnal surface temperatures and to estimate mean annual soil temperatures (MAST) and annual surface temperature amplitudes (AMP) in semi-arid east central Utah. Diurnal data with minimal snow and cloud cover were selected for five dates throughout a yearly period and geometrically co-registered. Rubber-sheet stretching was aided by the WARP program which allowed preview of image transformations. Daytime maximum and nighttime minimum temperatures were averaged to generation average daily temperature (ADT) data set for each of the five dates. Five ADT values for each pixel were used to fit a sine curve describing the theoretical annual surface temperature response as defined by a solution of a one-dimensional heat flow equation. Linearization of the equation produced estimates of MAST and AMP plus associated confidence statistics. MAST values were grouped into classes and displayed on a color video screen. Diurnal surface temperatures and MAST were primarily correlated with elevation. A.R.H.

N83-29754*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LANDSAT-4 SCIENTIFIC CHARACTERIZATION: EARLY RESULTS SYMPOSIUM
1983 149 p refs Symp. held in Greenbelt, Md., 22-24 Feb. 1983 ERTS
(E83-10356; NASA-TM-85389; NAS 1.15:85389) Avail: NTIS HC A07/MF A01 CSCL 05B

Radiometric calibration, geometric accuracy, spatial and spectral resolution, and image quality are examined for the thematic mapper and the multispectral band scanner on LANDSAT 4. Sensor performance is evaluated. For individual titles, see N83-29755 through N83-29767.

N83-29755*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LANDSAT-4 HIGHTLIGHTS
Darrel Williams *In its* LANDSAT-4 Sci. Characterization 1983 3 p (For primary document see N83-29754 18-43)
Avail: NTIS HC A07/MF A01 CSCL 05B

The LANDSAT 4 thematic mapper sensor possesses approximately twice the spectral resolution, three times the spatial resolution, and four times the spectral sensitivity of the MSS sensor on earlier LANDSAT satellites. Spectral bands on the TM, particularly those at wavelengths of 1.6 and 2.2 micrometers are useful for: (1) distinguishing crops such as rice and soybeans; (2) surveying areas that are cultivated in strip crop fashion; (3) determining clay variations and abundances and rock classifications; and (4) differentiating nutrients and sediments found in coastal waters. The sensor can identify surface features 30 meters on a side, which roughly corresponds to a standard city block. Highway construction, land excavation, urban growth, and the health and extent of vegetation can be detected. A.R.H.

N83-29756*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LANDSAT-4 EVALUATION PROGRAM AND SCIENTIFIC CHARACTERIZATION ACTIVITIES
John L. Barker *In its* LANDSAT-4 Sci. Characterization 1983 2 p (For primary document see N83-29754 18-43)
Avail: NTIS HC A07/MF A01 CSCL 05B

The characterization objectives of the LANDSAT 4 Science Office at GSFC are to: (1) determine the accuracy and precision of sensor and spacecraft performance, image data quality, and derived information; (2) recommend LANDSAT 4 system improvements; and (3) communicate results to the research community. In-house activities are directed toward full access and utilization of the prelaunch and in-orbit engineering test data on the sensor and spacecraft. Principle scientists in remote sensing are involved as part of a major scientific characterization effort, and workshops were held for these investigative teams. A symposium is scheduled prior to turnover of the TM to NOAA. A.R.H.

N83-29757*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
TM REPORT
John L. Barker *In its* LANDSAT-4 Sci. Characterization 1983 2 p (For primary document see N83-29754 18-43)
Avail: NTIS HC A07/MF A01 CSCL 05B

Key spectral, radiometric, and geometric characteristics of the

TM sensor are examined. Spectrally, band 5 is slightly wider than specified and its upper edge at 50% of miximum of 1784 nm includes some unintended overlap with water absorption bands. Thermal band 6 is half the expected width. Radiometrically, the TM has extreme linearity and stability in comparison with previous MSS photomultiplier systems. Forward and reverse scans on TM show some unexplained radiometric differences of up to four digital levels. Primary focal plane bands show a monotomic decrease in gain of about 5% in the five months since launch. The relative internal gains of bands 5 and 7 varied with a period of about 60 days and an amplitude of about 6%. Radiometric calibration must be applied before histogram equalization algorithms to preserve radiometric accuracy. Geometrically, channel 4 in band 2 has a smaller modulation transfer function than desired. There is apparent misregistration of .75 pixels along scan and 0.2 pixels across scan. A.R.H.

N83-29758*# Environmental Research Inst. of Michigan, Ann Arbor.

INVESTIGATION OF RADIOMETRIC PROPERTIES OF LANDSAT-4 MSS

Daniel P. Rice *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Characterization 1983 3 p (For primary document see N83-29754 18-43)

Avail: NTIS HC A07/MF A01 CSCL 05B

Two full frames of radiometrically corrected (Type A) LANDSAT-4 MSS data were analyzed digitally and visually for evidence of residual calibration differences between detectors, quantization effects, and other sensor-related artifacts. Both standard statistical and Fourier analysis techniques were employed. Opportunities for coincident coverage by LANDSATS 3 and 4 were identified in the contiguous 48 states. Paired acquisitions for two scenes were obtained and analyzed to establish relationships between signal values from common areas imaged by the two MSS Systems. Initial findings on detector-to-detector differences, coherent noise, and LANDSAT 4 to LANDSAT 3 calibration are summarized. Results show that LANDSAT 4 MSS produces data of generally good quality with dynamic ranges and target responses similar to those of previous sensors. A.R.H.

N83-29759*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

IMPACT OF LANDSAT MSS SENSOR DIFFERENCES ON CHANGE DETECTION ANALYSIS

William Likens and Robert Wrigley *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Characterization 1983 2 p (For primary document see N83-29754 18-43)

Avail: NTIS HC A07/MF A01 CSCL 05B

Differences in overall sensor response, due to both factors within the sensor system, and external factors such as atmospheric effects, must be dealt with before change detection techniques using image differencing can be successfully implemented. The approach used to be coregister data to a base, followed by between image scatterogram generation and evaluation, and image differencing. Data from LANDSAT 2 and 3 were registered to LANDSAT 4 data. The area was limited to a small protion of the scene near the City of Santa Cruz because this was the only area cloud and haze free on all the images. Visual examination of each image, as well as the between image scatterograms, provide information on radiometric characteristics of each sensor. The image differencing, after normalizing for radiometric differences, provides a visual depiction of geometric distortions. A.R.H.

N83-29760*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

SPECTRAL CHARACTERIZATION OF THE LANDSAT-4 THEMATIC MAPPER SENSORS

Brian L. Markham and John L. Barker *In its* LANDSAT-4 Sci. Characterization 1983 2 p (For primary document see N83-29754 18-43)

Avail: NTIS HC A07/MF A01 CSCL 05B

Data collected on the spectral characteristics of the LANDSAT-4 and LANDSAT-4 backup thematic mapper instruments, the protoflight (PF) and flight (F) models, respectively are analyzed and summarized. Tests were conducted on the instruments and their components to determine compliance with two sets of spectral specifications: Band-by-band spectral coverage and channel-by-channel within-band spectral matching. A.R.H.

N83-29761*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

THERMAL BAND CHARACTERIZATION OF LANDSAT-4 THEMATIC MAPPER

Jack C. Lansing (Santa Barbara Research Center, Goleta, Calif.) and John L. Barker *In its* LANDSAT-4 Sci. Characterization 1983 3 p (For primary document see N83-29754 18-43)

Avail: NTIS HC A07/MF A01 CSCL 05B

The TM band 6 shutter background and the 34.7 C internal black body signal were measured over 50 day dates. Variability of the shutter background temperature was from 7 C to 11 C. For ten specific images, the digital counts of the calibration data were measured. The average pulse value of the black body peak decreased from 174 to 149 counts while the shutter background counts varied as a function of shutter temperature from 77 to 85. Relative internal gains between the four channels were calculated and compared to prelaunch values. They showed gains over 9 months of up to 5%. Frequency histograms of number of pixels vs. digital counts from a night scene were used to determine gain relative to the mean and to discern a systematic along-scan pattern in a difference between forward and reverse scan counts of up to 0.5. A corrected digital image was obtained. A temperature estimate for and area of Lake Erie of 18.5 C to 19.9 C was obtained. Local temperature records showed 21 C. A.R.H.

N83-29762*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.

EVALUATION OF THE RADIOMETRIC QUALITY OF THE TM DATA USING CLUSTERING AND MULTISPECTRAL DISTANCE MEASURES

L. A. Bartolucci, M. E. Dean, and P. E. Anuta *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Characterization 1983 8 p (For primary document see N83-29754 18-43)

(Contract NAS5-26859)

Avail: NTIS HC A07/MF A01 CSCL 05B

Radiometrically and geometrically corrected TM data from three different geographic locations were examined. Histograms were inspected for each band to determine the dynamic range of the data, the shape of the distributions, and to verify whether empty bins were introduced by the radiometric correction process. The effect of geometric correction on the radiometry of the resampled pixels was determined. The information content between TM and MSS data sets were compared and the TM data were used to map the thermal effluent discharge into a river ecosystem from a nuclear thermal power plant, and application only possible previously only possible through the acquisition of thermal infrared scanner data from aircraft altitudes. A.R.H.

N83-29763*# Arizona Univ., Tucson.

IN-PROGRESS ABSOLUTE RADIOMETRIC INFLIGHT CALIBRATION OF THE LANDSAT-4 SENSORS

K. Castle, M. Dinguirard (Centre d'Etudes et de Recherches, Toulouse), C. E. Ezra (Dept. of Agriculture), R. G. Holm, R. J. Jackson (Dept. of Agriculture), C. J. Kastner, J. M. Palmer, R. Savage (Atmospheric Sciences Lab.), and P. N. Slater *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Characterization 1983 3 p (For primary document see N83-29754 18-43)

Avail: NTIS HC A07/MF A01 CSCL 05B

An approach is described for providing periodic inflight absolute radiometric calibrations of the LANDSAT-4 sensors by reference to selected, instrumented ground areas. Results of some early ground measurements and computer simulations are presented. Selection of a suitable ground reference site, accurate measurement of the spectral reflectance of the selected area, determination of atmospheric characteristics during the morning of the sensor overpass, reduction of the measured data and their use in an appropriate atmospheric radiative transfer program, and comparison

of the radiance level data with the digital counts of for the images of the selected areas are discussed. Preliminary measurements of gypsum are being made as an aid in defining the characteristics of field equipment to be constructed and calibrated for use over the White Sands Missile Range. A.R.H.

N83-29764*# Geological Survey, Flagstaff, Ariz.
THEMATIC MAPPER INTRABAND RADIOMETRIC PERFORMANCE
Hugh H. Kieffer, Eric Eliason, Pat Chavez, Raymond Batson, and Warren Borgeson *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Characterization 1983 2 p (For primary document see N83-29754 18-43)
Avail: NTIS HC A07/MF A01 CSCL 05B

There are small differences between the average DN for the 16 detectors in each band, typically 0.8 DN; the standard deviations also differ typically by 0.4 DN. Differences of mode in a band are as large as 6 DN. Some DN levels appear to be strongly favored over adjacent levels. Differences between forward and reverse scans are approximately 0.1 DN in the mean, and 0 to 0.6 DN in the standard deviation. Geometrically resampled images (P data), in which the fixed correspondence between lines and single detectors is lost, are statistically similiar to the ensemble of detectors in each band in A data. The magnitude of inter-detector variation is readily seen by making an image of the first derivative in the vertical (line) direction of a flat field and stretching progressively wider ranges to gray; most detectors differ from their neighbors by 1 to 2 DN. The film output from the GSFC filmwriter used for TM images was found to have scale errors in both sample and line directions corresponding to four pixels in a TM image, and skew corresponding to three pixels. A.R.H.

N83-29765*# Geological Survey, Reston, Va.
AN EVALUATION OF LANDSAT-4 THEMATIC MAPPER DATA FOR THEIR GEOMETRIC AND RADIOMETRIC ACCURACIES AND THEIR RELEVANCE TO GEOLOGIC MAPPING
L. U. Bender, M. H. Podwysocki, L. C. Rowan, and J. W. Salisbury *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Characterization 1983 5 p (For primary document see N83-29754 18-43)
Avail: NTIS HC A07/MF A01 CSCL 05B

Thematic mapper scenes for Washington, D.C. and Macon, Georgia were examined to determine their radiometry and geometric accuracy. Specific band ratios were used to determine their effectiveness in defining vegetation and rock mineralogy. the TM 3/4 band ratio was used to define vegetation and the 5/2 band ratio was used to define limonitic rocks. The 5/7 band ratio was evaluated to test the effectiveness of the 1.6 and 2.2 mm bands in detecting clay and carbonate bearing rocks. Preliminary results show that clay minerals containing absorption bands at 2.2 mm, which are centered in the TM band 7, can be readily detected when the band ratio images are suitably contrast stretched. Bright rocks, such as marbles, which contain absorption bands in the 2.33 mm region, near the wavelength of TM band 7, are only evident upon harsher contrast stretching of the 5/7 band ratio. Geobotanical studies of Washington, D.C. show that monospecific forest canopies can be differentiated. A.R.H.

N83-29766*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.
SPATIAL RESOLUTION ESTIMATION OF LANDSAT-4 TM AND MSS DATA
Clare D. McGillem, Paul E. Anuta, and Kai-Bor Yu *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Characterization 1983 5 p (For primary document see N83-29754 18-43)
(Contract NAS5-26859)
Avail: NTIS HC A07/MF A01 CSCL 05B

In order to verify that the LANDSAT-4 sensors are operating within specifications, it is useful to estimate the system parameters by analysis of the measured data. One parameter of particular interest is the sensor point-spread function (PSF) which determines the resolution of the system. A method of estimating the PSF is described that utilizes data obtained duriing scanning of ground elements having identifiable geometric and radiometric structure. These data are then processed in such a manner as to recover either the PSF itself or to estimate the parameters of an assumed functional representation of the PSF. A.R.H.

N83-29767*# Delaware Univ., Newark. Coll. of Marine Studies.
REMOTE SENSING INVESTIGATIONS OF WETLAND BIOMASS AND PRODUCTIVITY FOR GLOBAL BIOSYSTEMS RESEARCH
Michael Harkisky and Vytautas Klemas *In* NASA. Goddard Space Flight Center LANDSAT-4 Sci. Characterization 1983 4 p refs (For primary document see N83-29754 18-43)
Avail: NTIS HC A07/MF A01 CSCL 05B

Monitoring biomass of wetlands ecosystems can provide information on net primary production and on the chemical and physical status of wetland soils relative to anaerobic microbial transformation of key elements. Multispectral remote sensing techniques successfully estimated macrophytic biomass in wetlands systems. Regression models developed from ground spectral data for predicting Spartina alterniflora biomass over an entire growing season include seasonal variations in biomass density and illumination intensity. An independent set of biomass and spectral data were collected and the standing crop biomass and net primary productivity were estimated. The improved spatial, radiometric and spectral resolution of the LANDSAT-4 Thematic Mapper over the LANDSAT MSS can greatly enhance multispectral techniques for estimating wetlands biomass over large areas. These techniques can provide the biomass data necessary for global ecology studies. A.R.H.

N83-29768*# National Aeronautics and Space Administration. Earth Resources Labs., Bay St. Louis, Miss.
AGRICULTURAL LAND COVER MAPPING IN THE CONTEXT OF A GEOGRAPHICALLY REFERENCED DIGITAL INFORMATION SYSTEM
Eric R. Stoner Mar. 1982 66 p refs Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(E83-10357; NASA-TM-85390; NAS 1.15:85390; NSTL/ERL-205)
Avail: NTIS HC A04/MF A01 CSCL 05B

The introduction of soil map information to the land cover mapping process can improve discrimination of land cover types and reduce confusion among crop types that may be caused by soil-specific management practices and background reflectance characteristics. Multiple dates of LANDSAT MSS digital were analyzed for three study areas in northern Missouri to produce cover types for major agricultural land cover classes. Digital data bases were then developed by adding ancillary data such as digitized soil and transportation network information to the LANDSAT-derived cover type map. Procedures were developed to manipulate the data base parameters to extract information applicable to user requirements. An agricultural information system combining such data can be used to determine the productive capacity of land to grow crops, fertilizer needs, chemical weed control rates, irrigation suitability, and trafficability of soil for planting. A.R.H.

N83-29769*# Texas Univ. at Dallas, Richardson. Center for Space Sciences.
INVESTIGATION OF THE EFFECTS OF EXTERNAL CURRENT SYSTEMS ON THE MAGSAT DATA UTILIZING GRID CELL MODELING TECHNIQUES Final Report, 15 Sep. 1980 - 15 Nov. 1982
David M. Klumpar, Principal Investigator Nov. 1982 145 p refs Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(Contract NAS5-26309)
(E83-10358; NASA-CR-172884; NAS 1.26:172884; UTD-E0533-01) Avail: NTIS HC A07/MF A01 CSCL 05B

The feasibility of modeling magnetic fields due to certain electrical currents flowing in the Earth's ionosphere and magnetosphere was investigated. A method was devised to carry out forward modeling of the magnetic perturbations that arise from space

currents. The procedure utilizes a linear current element representation of the distributed electrical currents. The finite thickness elements are combined into loops which are in turn combined into cells having their base in the ionosphere. In addition to the extensive field modeling, additional softwre was developed for the reduction and analysis of the MAGSAT data in terms of the external current effects. Direct comparisons between the models and the MAGSAT data are possible. Author

N83-29770*# National Aeronautics and Space Administration. Earth Resources Labs., Bay St. Louis, Miss.
THREE-DIMENSIONAL PERSPECTIVE SOFTWARE FOR REPRESENTATION OF DIGITAL IMAGERY DATA
Bobby G. Junkin Dec. 1980 43 p refs Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(E83-10359; NASA-TM-85392; NAS 1.15:85392; NSTL/ERL-195) Avail: NTIS HC A03/MF A01 CSCL 09B

A generalized three dimensional perspective software capability was developed within the framework of a low cost computer oriented geographically based information system using the Earth Resources Laboratory Applications Software (ELAS) operating subsystem. This perspective software capability, developed primarily to support data display requirements at the NASA/NSTL Earth Resources Laboratory, provides a means of displaying three dimensional feature space object data in two dimensional picture plane coordinates and makes it possible to overlay different types of information on perspective drawings to better understand the relationship of physical features. An example topographic data base is constructed and is used as the basic input to the plotting module. Examples are shown which illustrate oblique viewing angles that convey spatial concepts and relationships represented by the topographic data planes. Author

N83-29771*# Washington Univ., Seattle.
THE 1980 LAND COVER FOR THE PUGET SOUND REGION
R. D. Shinn, Frank V. Westerlund, and James R. Eby Mar. 1982 156 p refs ERTS
(Contract NCA2-0r-850-001)
(E83-10360; NASA-CR-166492; NAS 1.26:166492) Avail: NTIS HC A08/MF A01 CSCL 08B

Both LANDSAT imagery and the video information communications and retrieval software were used to develop a land cover classifiction of the Puget Sound of Washington. Planning agencies within the region were provided with a highly accurate land cover map registered to the 1980 census tracts which could subsequently be incorporated as one data layer in a multi-layer data base. Many historical activities related to previous land cover mapping studies conducted in the Puget Sound region are summarized. Valuable insight into conducting a project with a large community of users and in establishing user confidence in a multi-purpose land cover map derived from LANDSAT is provided. Author

N83-29772*# National Aeronautics and Space Administration. Earth Resources Labs., Bay St. Louis, Miss.
UTILIZATION OF LANDSAT MULTISPECTRAL DATA IN GEOBOTANICAL INVESTIGATIONS: THE LOCATION OF IRONSTONE GRAVEL IN THE SAM HOUSTON NATIONAL FOREST
William G. Cibula Feb. 1982 24 p refs Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(E83-10361; NASA-TM-85391; NAS 1.15:85391; NSTL/ERL-199) Avail: NTIS HC A02/MF A01 CSCL 05B

Practical techniques were developed and evaluated for deriving geobotanical information from LANDSAT MSS data acquired for a test site in the Sam Houston National Forest near Cleveland, Texas where gravel deposits exist in sufficient quantity that economical extraction would be feasible. A correlation was shown between a single spectral class and the presence of ironstone gravel. Field data indicates that this class relates to upland pine which was probably under stress as the result of a prolonged drought which was in progress at the time of data acquisition. It is suggested that the subsurface gravel produces a soil which has less field capacity for water retention, causing early appearance of water stress in the surface vegetation over these soils. In all areas within the QMC formation where this class occurred, gravel was located when borings were made. A.R.H.

N83-29773*# National Aeronautics and Space Administration. Earth Resources Labs., Bay St. Louis, Miss.
COMPUTER IMPLEMENTED LAND COVER CLASSIFICATION USING LANDSAT MSS DIGITAL DATA: A COOPERATIVE RESEARCH PROJECT BETWEEN THE NATIONAL PARK SERVICE AND NASA. 3: VEGETATION AND OTHER LAND COVER ANALYSIS OF SHENANDOAH NATIONAL PARK
William G. Cibula Apr. 1981 74 p refs Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(E83-10362; NASA-TM-85338; NAS 1.15:85338; Rept-194) Avail: NTIS HC A04/MF A01 CSCL 08B

Four LANDSAT frames, each corresponding to one of the four seasons were spectrally classified and processed using NASA-developed computer programs. One data set was selected or two or more data sets were marged to improve surface cover classifications. Selected areas representing each spectral class were chosen and transferred to USGS 1:62,500 topographic maps for field use. Ground truth data were gathered to verify the accuracy of the classifications. Acreages were computed for each of the land cover types. The application of elevational data to seasonal LANDSAT frames resulted in the separation of high elevation meadows (both with and without recently emergent perennial vegetation) as well as areas in oak forests which have an evergreen understory as opposed to other areas which do not. A.R.H.

N83-29774*# Brown Univ., Providence, R. I. Geophysical/Electromagnetics Lab.
ELECTROMAGNETIC DEEP-PROBING (100-1000 KMS) OF THE EARTH'S INTERIOR FROM ARTIFICIAL SATELLITES: CONSTRAINTS ON THE REGIONAL EMPLACEMENT OF CRUSTAL RESOURCES Final Report, Jun. 1980 - Feb. 1983
John F. Hermance Jun. 1983 139 p refs ERTS
(Contract NAS5-26138)
(E83-10363; NASA-CR-172891; NAS 1.26:172891) Avail: NTIS HC A07/MF A01 CSCL 08G

The reconnaisance phase of using satellite observations to studying electromagnetic induction in the solid earth is summarized. Several points are made: (1) satellite data apparently suffer far less from the effects of near surface lateral heterogeneities in the earth than do ground-based data; (2) zonal ionospheric currents during the recovery phase of major magnetic storms appear to be minimal, at least in the dawn and dusk sectors wher MAGSAT was flown; hence the internal contributions that satellites observe during these times is in fact due primarily to induction in the Earth with little or no contribution from ionospheric currents; and (3) the interpretation of satellite data in terms of primitive electromagnetic response functions, while grossly over-simplified, results in a surprisingly well-resolved radius for an equivalent super-conductor representing the conductivity region of the Earth's interior (5,370 + or - 120 km). Author

N83-29775*# Public Technology, Inc., Washington, D. C.
LOCAL GOVERNMENTS LANDSAT APPLICATIONS PROGRAM Final Report
[1983] 165 p refs Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(Contract NAS5-24335)
(E83-10364; NASA-CR-172892; NAS 1.26:172892) Avail: NTIS HC A08/MF A01 CSCL 05B

The approach used to develop the internal capabilities of local governments to handle and evaluate LANDSAT data included remote sensing training, development of a low-cost digital image processing system, and technical assistance. Cost sharing, program management and coordination, and networking were also employed to address problems related to land use, water resources, environmental assessment, and air quality as experienced by urban

planners. Local experiences gained in Atlanta, Georgia; Henrico County, Virginia; Oklahoma City; Oklahoma; and San Jose, California are described. Policy recommendations formulated for transferring remote sensing technologies to local governments are included. A.R.H.

N83-29776*# Computer Sciences Corp., Silver Spring, Md.
APPLICATION OF SEASAT-1 SYNTHETIC APERTURE RADAR (SAR) DATA TO ENHANCE AND DETECT GEOLOGICAL LINEAMENTS AND TO ASSIST LANDSAT LANDCOVER CLASSIFICATION MAPPING
R. Sekhon Sep. 1981 124 p refs Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(Contract NAS5-24350)
(E83-10365; NASA-CR-172893; NAS 1.26:172893; CSC/TM-81/6238) Avail: NTIS HC A06/MF A01 CSCL 17I

Digital SEASAT-1 synthetic aperture radar (SAR) data were used to enhance linear features to extract geologically significant lineaments in the Appalachian region. Comparison of Lineaments thus mapped with an existing lineament map based on LANDSAT MSS images shows that appropriately processed SEASAT-1 SAR data can significantly improve the detection of lineaments. Merge MSS and SAR data sets were more useful fo lineament detection and landcover classification than LANDSAT or SEASAT data alone. About 20 percent of the lineaments plotted from the SEASAT SAR image did not appear on the LANDSAT image. About 6 percent of minor lineaments or parts of lineaments present in the LANDSAT map were missing from the SEASAT map. Improvement in the landcover classification (acreage and spatial estimation accuracy) was attained by using MSS-SAR merged data. The aerial estimation of residential/built-up and forest categories was improved. Accuracy in estimating the agricultural and water categories was slightly reduced. A.R.H.

N83-29777*# Tokyo Univ. (Japan). Geophysics Research Lab.
JAPANESE MAGSAT TEAM Final Report
N. Fukushima, H. Maeda (Kyoto Univ., Japan), T. Yukutake, M. Tanaka (Geographical Survey Inst., Tsukuba, Japan), Y. Miyazaki (Geographical Survey Inst., Tsukuba, Japan), S. Oshima (Maritime Safety Agency, Tokyo), K. Ogawa (Geological Survey of Japan, Tsukuba), M. Kawamura (Magnetic Observatory, Kakioka, Japan), S. Uyeda, K. Kobayashi et al 15 Nov. 1982 67 p refs Sponsored by NASA ERTS
(E83-10366; NASA-CR-172908; NAS 1.26:172908) Avail: NTIS HC A04/MF A01 CSCL 05B

Construction of a model of the regional magnetic field and investigation of the local magnetic anomalies and their origin were approaches used in attempts to study the crustal structure near Japan and its Antarctic bases. Spatial properties of the regional magnetic field and comparison of the regional model with that derived from MAGSAT data are discussed. Possible causes of the magnetic anomalies, and results of aeromagnetic surveys incorporating gravity and seismic data are explored. Ionospheric and magnetospheric contributions to geomagnetic variations, field-aligned currents, magnetic geomagnetic pulsations, and hydromagnetic waves by analysis of MAGSAT data are also examined. A.R.H.

N83-29778*# Florida Univ., Gainesville. Climatology Lab.
SATELLITE FREEZE FORECAST SYSTEM: EXECUTIVE SUMMARY Final Report
J. David Martsolf, Principal Investigator 14 Apr. 1983 24 p refs Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198
(Contract NAS10-9892)
(E83-10368; NASA-CR-166829; NAS 1.26:166829) Avail: NTIS HC A02/MF A01 CSCL 04B

A satellite-based temperature monitoring and prediction system consisting of a computer controlled acquisition, processing, and display system and the ten automated weather stations called by that computer was developed and transferred to the national weather service. This satellite freeze forecasting system (SFFS) acquires satellite data from either one of two sources, surface data from 10 sites, displays the observed data in the form of color-coded thermal maps and in tables of automated weather station temperatures, computes predicted thermal maps when requested and displays such maps either automatically or manually, archives the data acquired, and makes comparisons with historical data. Except for the last function, SFFS handles these tasks in a highly automated fashion if the user so directs. The predicted thermal maps are the result of two models, one a physical energy budget of the soil and atmosphere interface and the other a statistical relationship between the sites at which the physical model predicts temperatures and each of the pixels of the satellite thermal map. A.R.H.

N83-29779*# Florida Univ., Gainesville. Climatology Lab.
SATELLITE FREEZE FORECAST SYSTEM Final Report
J. David Martsolf, Principal Investigator 14 Apr. 1983 39 p ERTS
(Contract NAS10-9892)
(E83-10369; NASA-CR-166830; NAS 1.26:166830) Avail: NTIS HC A03/MF A01 CSCL 04B

Provisions for back-up operations for the satellite freeze forecast system are discussed including software and hardware maintenance and DS/1000-1V linkage; troubleshooting; and digitized radar usage. The documentation developed; dissemination of data products via television and the IFAS computer network; data base management; predictive models; the installation of and progress towards the operational status of key stations; and digital data acquisition are also considered. The addition of dew point temperature into the P-model is outlined. A.R.H.

N83-29780*# Florida Univ., Gainesville.
SATELLITE FREEZE FORECAST SYSTEM. SYSTEM CONFIGURATION DEFINITION MANUAL Final Report
J. David Martsolf, Principal Investigator 14 Apr. 1983 17 p ERTS
(Contract NAS10-9892)
(E83-10370; NASA-CR-166831; NAS 1.26:166831) Avail: NTIS HC A02/MF A01 CSCL 05B

Equipment listings, interconnection information, and a basic overview is given of the hardware interaction of the Ruskin HP-100 computer system. A block diagram is included of the SFFS system at the National Weather Service Office in Ruskin, Florida. The generation answer file used to create the RTE-IVB operating system currently resident in Ruskin HP-1000 computer system is also described. A.R.H.

N83-29781*# Florida Univ., Gainesville. Climatology Lab.
SATELLITE FREEZE FORECAST SYSTEM. OPERATING/TROUBLESHOOTING MANUAL Final Report
J. David Martsolf, Principal Investigator 14 Apr. 1983 33 p ERTS
(Contract NAS10-9892)
(E83-10371; NASA-CR-166833; NAS 1.26:166833) Avail: NTIS HC A03/MF A01 CSCL 04B

Examples of operational procedures are given to assist users of the satellites freeze forecasting system (SFFS) in logging in on to the computer, executing the programs in the menu, logging off the computer, and setting up the automatic system. Directions are also given for displaying, acquiring, and listing satellite maps; for communicating via terminal and monitor displays; and for what to do when the SFFS doesn't work. Administrative procedures are included. A.R.H.

N83-29782*# Florida Univ., Gainesville. Climatology Lab.
SATELLITE FREEZE FORECAST SYSTEM. SYSTEM SOFTWARE DOCUMENTATION MANUAL Final Report
J. David Martsolf, Principal Investigator 14 Apr. 1983 67 p ERTS
(Contract NAS10-9892)
(E83-10372; NASA-CR-166832; NAS 1.26:166832) Avail: NTIS HC A04/MF A01 CSCL 04B

The title, author, purpose, methodology, and operation are

described for all software written for and used by the satellite freeze forecasting system. A.R.H.

N83-29783*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FLOW RESISTIVITY INSTRUMENT Patent Application
Allan J. Zuckerwar, inventor (to NASA) Filed 27 Jun. 1983 10 p
(NASA-Case-LAR-13053-1; US-Patent-Appl-SN-508372) Avail: NTIS HC A02/MF A01 CSCL 08H

A method and apparatus for making in-situ measurements of flow resistivity on the Earth's ground surface is summarized. The novel feature of the invention is two concentric cylinders, inserted into the ground surface with a measured pressure applied to the surface inside the inner cylinder. The outer cylinder vents a plane beneath the surface to the atmosphere through an air space. The flow to the inner cylinder is measured thereby indicating the flow from the surface to the plane beneath the surface. NASA

N83-29784# Defense Mapping Agency Aerospace Center, St. Louis, Mo. Advanced Technology Div.
INTERACTIVE ANALYSIS OF DIGITAL TERRAIN ELEVATION AND SURFACE FEATURE DATA BASES Interim Report, 1981 - 1982
Marshall B. Faintich 1983 12 p refs Presented at the ISPRS WG III-3 Intern. Colloq. on Math. Aspects of Digital Elevation Models, Stockholm, 18-20 Apr. 1983 and at the ISPRS WG III-5 Spec. Workshop on Pattern Recognition in Photogrammetry, Graz, 27-29 Sep. 1983
(AD-A126310) Avail: NTIS HC A02/MF A01 CSCL 09/2

The Defense Mapping Agency produces digital data bases that describe the physical appearance of the surface of the Earth. A dramatic impact has been made in the ability to analyze these digital data bases by applying state-of-the-art digital image technology processing and display concepts. For purposes of quality control and data base applicability investigations, DMA has developed the Sensor Image Simulator (SIS), a very high speed data base edit station and static scene simulator that allows for interactive query and manipulation of individual features in the data base displays and/or simulated sensor scenes to determine the corresponding data base elements responsible for the simulated features. The SIS was installed at DMA in 1981, and plays a key role in determining the applicability of prototype data bases for use in advanced training simulators, as well as to ensure the quality of, and coherence between, the various digital data bases prior to new data insertion into the master cartographic data base files. Author (GRA)

N83-29785# Atmospheric and Environmental Research, Inc., Cambridge, Mass.
REMOTE SENSING OF SURFACE PROPAGATION PARAMETERS: APPLICATION OF IMAGERY SIMULATION MODEL RESULTS Final Report, 1 Oct. 1980 - 31 Oct. 1982
Ronald G. Isaacs 31 Oct. 1982 248 p refs
(Contract N00014-80-C-0262)
(AD-A125513) Avail: NTIS HC A11/MF A01 CSCL 12/1

A mathematical model is described and documented which simulates the sensitivity of satellite incident visible and near infrared radiances (0.4-1.1 micron wavelength spectral interval) to variations in the meteorological variables (such as relative humidity and wind speed) characterizing the environment near the ocean surface. Potential applications include support of meteorological analysis of DMSP visible imagery and operational satellite-based retrieval of the aerosol contribution to optical range degradation. Attributes of the model include: (1) calculation of solar/satellite sub-point and scan line pixel location based on nominal DMSP orbital characteristics; (2) choice of aerosol optical properties from among tropospheric, maritime, rural and urban models; (3) surface reflectivity based on statistics of wind-driven, rough ocean; and (4) approximate radiative transfer calculation of satellite incident radiances. The theoretical basis of each model subcomponent is fully discussed. A variety of supporting calculations are provided including radiance simulations in sunglint regions, DMSP imagery simulation, and comparison of simulated DMSP radiances to hardcopy imagery. The model is implemented in the form of a user-oriented, computationally efficient computer algorithm for a desk-top mini-computer. Documentation, listings, and sample test runs are provided. GRA

N83-29786# Kansas Univ., Lawrence.
ASSESSMENT OF THE GEOTHERMAL RESOURCES OF KANSAS. VOLUME 2, SECTION 2: APPENDICES
Jun. 1982 55 p
(Contract DE-AS07-79ET-27204)
(DE83-003221; DOE/ET-27204/T1-Vol-2-Sect-2) Avail: NTIS HC A04/MF A01

Regression analyses of thermal logging data, usable and non-usable, for 1980 and 1981 is given. DOE

N83-29787# Battelle Columbus Labs., Ohio.
ORGANIC GEOCHEMISTRY OF DEEP GROUND WATERS
Jeffrey L. Means Dec. 1982 60 p refs
(Contract DE-AC06-76RL-01830)
(DE83-005333; ONWI-268) Avail: NTIS HC A04/MF A01

Groundwaters from deep aquifers near Hanford, was Washington and the Finnsjoen, Sterneo, and Stripa Mine areas of Sweden evaluated to identify organic compounds possessing radionuclide-complexing capacity. Chromatographable compounds were analyzed using a gas chromatography-mass spectrometry (GC-MS) procedure. Humic substances were characterized by molecular weight using a combination dialysis/gel filtration chromatography (GFC) technique. An ineresting group of phenols was identified in the groundwater from Washington State, and certain groundwaters from Sweden contained several different fatty acids, however chromatographable organic ligands such as fatty acids and phenols were present in all samples only in very low (generally < 5 ppB) concentrations and comprised only a small proportion of the total organic content. Dialysis/GFC analyses suggest that the organic constituents in all of the groundwater predominantly consist of low molecular weight fulvic acid. Molecular weights of organics present increase in the order Finnsjoen groundwater < Stripa Mine groundwaters < Washington groundwater. DOE

N83-29788# Bendix Field Engineering Corp., Grand Junction, Colo.
HYDROGEOCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE BASIC DATA FOR BANGOR AND BATH QUADRANGLES, MAINE
25 Feb. 1983 26 p Prepared in cooperation with Union Carbide Corp.
(Contracts DE-AC13-76GJ-01664; W-7405-eng-26)
(DE83-005630; GJBX-174-82; K/UR-454) Avail: NTIS HC A03/MF A01

Hydrogeochemical data are presented for surface water and ground water from the Bangor and Bath quadrangles in Maine. DOE

N83-29789# Department of Energy, Washington, D. C. Office of Coal, Nuclear, Electric and Alternate Fuels.
DEMONSTRATED RESERVE BASE OF COAL IN THE UNITED STATES ON 1 JANUARY 1980
May 1982 40 p refs
(DE83-006471; DOE/EIA-0280(80)) Avail: NTIS HC A03/MF A01

This is the second in a series of annual summaries on minable coal in the United States, pursuant to the power plant and industrial fuel use act. The demonstrated reserve base of coal in the United States on January 1, 1980 by area, rank, and potential method of mining is given. Reserve data are given by state and by type of coal (anthracite, bithiminous, subbituminous, and lignite). An introduction, summary, and a glossary of selected coal classification terms is also included. The appendix provides the demonstrated reserves base adjustments and related not ions by state. References are also included. Coal reserves for 1979 are given for comparison. 7 figures, 6 tables. DOE

N83-29790# Utah Geological and Mineralogical Survey, Salt Lake City.

EVALUATION OF LOW-TEMPERATURE GEOTHERMAL POTENTIAL IN CACHE VALLEY, UTAH M.S. Thesis
Janet L. deVries and Robert H. Klauk Nov. 1982 112 p refs
(Contracts DE-AS07-77ET-28393; EG-77-5-7-1679)
(DE83-001219; DOE/ET-28393/T1) Avail: NTIS HC A06/MF A01

Some 90 wells and springs were located and water samples were collected. Thermal gradients were approximately the same as the average for the Basin and Range province, about 350 C/km. One well produced a gradient of 2970 C/km, most probably as a result of a near-surface occurrence of warm water. Possible warm water reservoir temperatures were calculated using both the silica and the Na-K-Ca geothermometers, with the results averaging about 50 to 1000 C. If mixing calculations were applied, taking into account the temperatures and silica contents of both warm springs or wells and the cold groundwater, reservoir temperatures up to about 2000 C were indicated. Considering measured surface water temperatures, calculated reservoir temperatures, thermal gradients, and the local geology, most of the Cache Valley, Utah area is unsuited for geothermal development. However, the areas of North Logan, Benson, and Trenton were found to have anomalously warm groundwater in comparison to the background temperature of 1300 C for the study area. The warm water has potential for isolated energy development but is not warm enough for major commercial development. DOE

N83-29791# Research Inst. of National Defence, Linkoeping (Sweden). Dept. 3.
MATCHING EDGES IN MAPS AND AERIAL IMAGES USING THE CHAMFER MATCHING ALGORITHM
Gunilla Borgefors Mar. 1983 62 p refs
(FOA-C-30315-E1) Avail: NTIS HC A04/MF A01; Research Institute of National Defence KR 50

The purpose of matching edges is to find the same geographical features in two different images. An algorithm for matching edges called chamfer matching is investigated. The possible applications for this algorithm are, among others, navigation, presentation of multisensor data and precision rectification. Chamfer matching is a fine matching method, which can be used when the position of the edge searched for is roughly known. Both translation and rotation of the edge are considered. The computational examples show that chamfer matching works quite well in many realistic situations. Author (ESA)

N83-29792# Soil Test Services, Inc., Northbrook, Ill.
SENSING SYSTEMS FOR MEASURING MECHANICAL PROPERTIES IN GROUND MASSES. VOLUME 2: IN SITU TESTING WITH THE MENARD PRESSUREMETER Final Report, Sep. 1977 - Aug. 1978
K. Kastman, R. Lukas, and T. Venema Oct. 1982 92 p 4 Vol.
(Contract DOT-FH-11-9363)
(PB83-155952; FHWA/RD-81/110) Avail: NTIS HC A05/MF A01 CSCL 08M

The Menard pressuremeter is an in situ testing device which can be used to provide design parameters for nearly all soil and soft rock formations. Testing experiences, prime uses of the equipment, its limitations and methods of evaluation are discussed. Nine case histories are included to point out typical usage and conditions where the pressuremeter was an appropriate, in situ measuring device. GRA

N83-29793# Massachusetts Inst. of Tech., Cambridge. Constructed Facilities Div.
SENSING SYSTEMS FOR MEASURING MECHANICAL PROPERTIES IN GROUND MASSES. VOLUME 3: VANE SHEAR AND CONE PIEZOMETER Final Report, Nov. 1977 - Jul. 1978
Suzanne M. Lacasse, Charles C. Ladd, and Mohsen M. Baligh Oct. 1982 171 p refs 4 Vol.
(Contract DOT-FH-11-9364)
(PB83-155960; FHWA/RD-81/111) Avail: NTIS HC A08/MF A01 CSCL 08M

Reasonable estimates of the in situ strength of most saturated sedimentary clays are obtained from field vane results corrected according to Bierrum's relationship with plasticity index and the test used to help evaluate the stress history of clay deposits. It is found that the electrical Dutch cone test is better suited than the field vane to investigate strength variability. Pore pressures by the piezometer probe, give a clear picture of soil variability, especially regarding the presence of sand or clay layers located within an otherwise homogeneous deposit. This device investigates variations in the in situ coefficient of consolidation. GRA

N83-29794# CH2M/Hill, Inc., Corvallis, Oreg.
SENSING SYSTEMS FOR MEASURING MECHANICAL PROPERTIES IN GROUND MASSES. VOLUME 4: STATIC PENETROMETER Final Report, Sep. 1977 - Aug. 1978
John Ramage and Stuart S. Williams, Jr. Oct. 1982 107 p refs 4 Vol.
(PB83-155978; FHWA/RD-82/112) Avail: NTIS HC A06/MF A01 CSCL 08M

The performing organization's use of the Begemann type static cone penetrometer as a subsurface soil investigative tool is described. Applications, methods of interpretation, accuracy and limitations are discussed and five case histories are presented. The case histories are from Oregon and Washington. The case histories make use of the static cone penetrometer data to solve the following types of problems: subsurface soil profile identification, shallow tooling design (settlement), deep foundation design (capacity), and construction control. GRA

N83-29795# National Oceanic and Atmospheric Administration, Washington, D. C.
SATELLITE OBSERVATION OF GREAT LAKES ICE: 1980-81
Annie Lou Bell Dec. 1982 44 p refs
(PB83-156877; NOAA-TM-NESS-119; NOAA-S/T-82-255) Avail: NTIS HC A03/MF A01 CSCL 08L

Ice conditions on the five Great Lakes and Lake St. Clair were studied from satellite imagery. The formation, movement, and dissipation of lake ice from December 1980-May 1981 was studied. Wind speed and directions were studied as components of ice formation and dissipation. Data were gathered by geostationary operational satellite (GOES). GRA

N83-29796# GeoScience Research Corp., Salisbury, Md.
EAST ANTARCTIC ICE SHEET SURFACE CONTOURS FROM SATELLITE RADAR ALTIMETRY, A DEMONSTRATION
Ronald L. Brooks and George A. Norcross Sep. 1982 50 p refs
(Grant NSF DPP-80-20384)
(PB83-166397; ANTART-BIB-I-27522) Avail: NTIS HC A03/MF A01 CSCL 08L

Retracking the surface return waveforms from 37 SEASAT radar altimeter ground tracks across a 650,000 sq km study area in East Antarctica has resulted in 27,327 surface elevations for the area. It has been demonstrated that these satellite altimeter-derived surface elevations are internally consistent at the 1.5 m level and agree very well with the geoceiver coordinates and other surveys. Author (GRA)

N83-29797# Institute of Hydrology, Wallingford (England).
DERIVATION OF CATCHMENT AVERAGE UNIT HYDROGRAPH Final Report
D. B. Boorman and D. W. Reed Jul. 1981 56 p refs Sponsored in part by Natural Environment Research Council, London
(PB83-164574) Avail: NTIS HC A04/MF A01 CSCL 08H

Two methods of deriving catchment average unit hydrograph from a number of recorded flood events in rainfall runoff modelling are considered: (1) averaging unit hydrographs derived from individual events, and (2) joint analysis of a group of events to determine an average unit hydrograph directly. It is found that the problems of instability in least squares unit hydrographs derived from individual events have little influence on average unit hydrographs determined for eight trial catchments. GRA

N83-29798# Institute of Hydrology, Wallingford (England).
MORECS (METROLOGICAL OFFICE RAINFALL AND EVAPORA-

TION CALCULATION SCHEME) DISCUSSION MEETING, APRIL 1981 Final Report
C. M. K. Gardner Aug. 1981 64 p refs
(PB83-163212) Avail: NTIS HC A04/MF A01 CSCL 08H

The report consists of ten papers presented at a meeting held at the Institute of Hydrology to discuss the Meteorological Office Rainfall and Evaporation Calculation Scheme, MORECS. The emphasis of the meeting was on the estimation of soil moisture deficits. The papers included: a description of MORECS; discussions of some of its assumptions; a comparison of its estimates of soil moisture deficit with field measurements; and reviews of the scheme and its use in the agricultural and water industries.
Author (GRA)

N83-29799# Bureau of Mines, Pittsburgh, Pa.
ELECTROMAGNETIC SURFACE FIELDS DUE TO A MAGNETIC DIPOLE BURIED IN A THREE-LAYERED EARTH. REPORT OF INVESTIGATIONS, 1982
Steven M. Shope Oct. 1982 28 p
(PB83-148064; BM-RI-8702) Avail: NTIS HC A03/MF A01 CSCL 08I

Through the Earth electromagnetic wave propagation was studied. An Earth model incorporating a magnetic dipole buried in a three layered Earth was developed. The dipole source is located in the second subsurface layer. By application of proper limiting values, the three layered model is reduced to two different two layered models and eventually to the homogeneous half space model. The solutions are in the form of infinite integrals. A numerical analysis was carried out and a computer program written to evaluate the surface magnetic fields. Numerical values for the magnetic field at the point above the source are presented in a variety of models.
GRA

N83-29800# Minnesota Univ., St. Paul. Water Resources Research Center.
GROUND WATER QUALITY IN SOUTHEASTERN MINNESOTA
R. D. Singer, M. T. Osterholm, and C. P. Straub Oct. 1982 56 p refs
(PB83-154377; WRRC-BULL-109; W83-01791; OWRT-A-035-MINN(2)) Avail: NTIS HC A04/MF A01 CSCL 08H

Water quality of 21 private wells in the karst area of southeastern Minnesota was studied from Feb. 1977 to May 1979. The wells were located within a one-township area and were chosen for study following a questionnaire survey by type of construction and aquifer(s) in which they were completed. Thirteen routine and six runoff samples were collected from each well during the study and were examined for 18 biological, physical and chemical parameters. The parameters measured in samples from wells in the Galena Formation had the most variation with total coliform and nitrate nitrogen concentrations. The parameters found to be the best indicators of surface water contamination of the aquifers and therefore indicators of possible health effects as a result of consumption of such were: bacterial counts, nitrate nitrogen, turbidity, conductivity, sulfate, chloride, phosphate, and total organic carbon.
Author (GRA)

N83-29801# National Geodetic Survey, Rockville, Md.
AUTOMATIC DETECTION OF LOOPS IN LEVELING NETWORKS
Edward H. Herbrechtsmeier Jul. 1982 21 p refs
(PB83-154641; NOAA-TM-NOS-NGS-35; NOAA-82072303) Avail: NTIS HC A02/MF A01 CSCL 08E

This publication describes an algorithm for finding a minimal set of fundamental loops in a network and discusses the application of the algorithm to leveling networks.
Author (GRA)

N83-29802# Geological Survey, San Juan (Puerto Rico).
WATER RESOURCES DATA FOR PUERTO RICO, 1979-1980 Report, 1 Oct. 1978 - 30 Sep. 1980
Aug. 1982 412 p refs Sponsored in part by the Commonwealth of Puerto Rico and other agencies
(PB83-159483; USGS/WRD/HD-81/040; USGS-WRD-PR-80-1) Avail: NTIS HC A18/MF A01 CSCL 08H

Water-resources data for surface-water, quality-of-water, and ground-water records for 1979-80 water years for Puerto Rico consist of records of discharge, water quality of streams, and water levels of wells. This report contains discharge and water-quality records for 36 gaging stations, 109 water-quality stations, and water levels for 50 observation wells. Also included are data for 17 crest-stage partial-record stations.
Author (GRA)

N83-29286# Joint Publications Research Service, Arlington, Va.
DYNAMICS OF OCEAN AND ATMOSPHERE ON BASIS OF OBSERVATIONS FROM SALYUT-6
B. A. Nelepo, V. V. Kovalenok, G. K. Korotayev, and G. A. Grishin *In its* USSR Rept.: Space, No. 22 (JPRS-83612) 6 Jun. 1983 p 53-60 Transl. into ENGLISH from Zemlya i Vselsnnaya (Moscow), no. 1, Jan. - Feb. 1983 p 41-45 (For primary document see N83-29280 18-12)
Avail: NTIS HC A06

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N83-29803 Netherlands Organization for Applied Scientific Research TNO, Delft. Hoofdgroep Maatschappelijke Technologie.
PRELIMINARY INVESTIGATION OF THE CHARACTERISTICS OF AN OSCILLATING WINDPOWERED GENERATOR [ORIENTEREND ONDERZOEK NAAR DE EIGENSCHAPPEN VAN EEN VLAAGGENERATOR]
P. E. J. Vermeulen Dec. 1981 43 p refs In DUTCH Original contains color illustrations
(TNO-82-0344) Copyright. Avail: Issuing Activity

The requirements for active turbulence generating systems are discussed and measurements with an oscillating vane generator are described. The excitation of lateral velocity fluctuations was investigated. The oscillating vane concept allows these fluctuations to be adjusted within a limited domain directly by the incident angle variations of the generator blades. This enables a turbulence structure in the frequency, amplitude, and time domains to be obtained. The lateral fluctuations are accompanied by small longitudinal fluctuations which are limited by keeping the profile resistance as low as possible. Measurements were performed with an oscillating vane system generating longitudinal velocity fluctuations, which are much determined by the blades incident angle. Contrary to the lateral fluctuations case, the domain for behind generator can be used, enabling the longitudinal fluctuation generator to be put at a certain distance in front of the lateral fluctuation generator in a combined turbulence generating system.
Author (ESA)

N83-29804*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
HIGH THERMAL POWER DENSITY HEAT TRANSFER APPARATUS PROVIDING ELECTRICAL ISOLATION AT HIGH TEMPERATURE USING HEAT PIPES Patent Application
James F. Morris, inventor (to NASA) Filed 24 Jun. 1983 10 p
(NASA-Case-LEW-12950-2; US-Patent-Appl-SN-507626) Avail: NTIS HC A02/MF A01 CSCL 10A

This invention is directed to transferring heat from an extremely high temperature source to an electrically isolated lower temperature receiver. The invention is particularly concerned with supplying thermal power to a thermionic converter from a nuclear

reactor with electric isolation. Heat from a high temperature heat pipe is transferred through a vacuum or a gap filled with electrically nonconducting gas to a cooler heat pipe. The heat pipe is used to cool the nuclear reactor while the heat pipe is connected thermally and electrically to a thermionic converter. If the receiver requires greater thermal power density, geometries are used with larger heat pipe areas for transmitting and receiving energy than the area for conducting the heat to the thermionic converter. In this way the heat pipe capability for increasing thermal power densities compensates for the comparatively low thermal power densities through the electrically nonconducting gap between the two heat pipes. NASA

N83-29805*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
POLYVINYL ALCOHOL BATTERY SEPARATOR CONTAINING INERT FILLER Patent Application
Dean W.L Sheibley, Li-Chen Hsu, and Michelle A. Manzo, inventors (to NASA) Filed 3 Feb. 1983 13 p
(NASA-Case-LEW-13556-2; US-Patent-Appl-SN-463440) Avail: NTIS HC A02/MF A01 CSCL 10C

A cross-linked polyvinyl alcohol battery separator is described. A particulate filler, inert to the alkaline electrolyte of an alkaline battery, is incorporated in the separator in an amount of 1 to 20% by weight, based on the weight of the polyvinyl alcohol, and is dispersed throughout the product. Incorportion of the filler enhances performance and increases cycle life of alkaline batteries when compared with batteries containing a similar separator not containing filler. Suitable fillers include titanates, silicates, zirconates, aluminates, wood flour, lignin, and titania. Particle size is not greater than about 50 microns. NASA

N83-29806*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PRODUCTION OF BUTANOL BY FERMENTATION IN THE PRESENCE OF CO-CULTURE OF CLOSTRIDIUM Patent Application
Sheryl L. Bergstrom (JPL, California Inst. of Tech., Pasadena) and Gary L. Foutch, inventors (to NASA) (JPL, California Inst. of Tech., Pasadena) Filed 10 May 1983 10 p
(Contract NAS7-100)
(NASA-Case-NPO-16203-1; US-Patent-Appl-SN-493179) Avail: NTIS HC A02/MF A01 CSCL 10A

Sugars are converted to a mixture of solvents including butanol by a fermentation process employing a co-culture of microorganisms of the clostridium genus, one of said microorganisms favoring the production of butyric acid and the other of which converts the butyric acid so produced to butanol. The use of a co-culture substantially increases the yield of butanol over that obtained using a culture employing only one microorganism. NASA

N83-29807# Committee on Governmental Affairs (U. S. Senate).
OVERSIGHT OF DEPARTMENT OF ENERGY RESEARCH AND DEVELOPMENT FACILITIES
Washington GPO 1983 138 p ref Hearing before the Permanent Subcomm. on Invest. of the Comm. on Govt. Affairs, 97th Congr., 2d Sess., 27 Jul. 1982
(GPO-99-908) Avail: Permanent Subcommittee on Investigations

The management and administration of the research and development facilities are investigated. The internal procedural controls within these facilities and their oversight are assessed. S.L.

N83-29808*# Jet Propulsion Lab., California Inst. of Tech., Pasadena. Solar Array Project.
FSA FIELD TEST REPORT, 1980 - 1982
H. G. Maxwell, C. A. Grimmett, J. Repar, P. O. Frickland, and J. A. Amy 15 Apr. 1983 87 p refs
(Contracts NAS7-100; DE-AI01-76ET-20356)
(NASA-CR-172863; JPL-Pub-83-29; NAS 1.26:172863) Avail: NTIS HC A05/MF A01 CSCL 10A

Photovoltaic modules made of new and developing materials were tested in a continuing study of weatherability, compatibility, and corrosion protection. Over a two-year period, 365 two-cell submodules have been exposed for various intervals at three outdoor sites in Southern California or subjected to laboratory acceptance tests. Results to date show little loss of maximum power output, except in two types of modules. In the first of these, failure is due to cell fracture from the stresses that arise as water is regained from the surrounding air by a hardboard substrate, which shrank as it dried during its encapsulation in plastic film at 150 C in vacuo. In the second, the glass superstrate is sensitive to cracking, which also damages the cells electrostatically bonded to it; inadequate bonding of interconnects to the cells is also a problem in these modules. In a third type of module, a polyurethane pottant has begun to yellow, though as yet without significant effect on maximum power output. Author

N83-29809*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
APPLICATIONS OF ETHYLENE VINYL ACETATE AS AN ENCAPSULATION MATERIAL FOR TERRESTRIAL PHOTOVOLTAIC MODULES
E. F. Cuddihy, C. D. Coulbert, R. H. Liang, A. Gupta, P. Willis, and B. Baum 15 Apr. 1983 80 p refs
(Contracts NAS7-100; DE-AI01-76ET-20356)
(NASA-CR-172862; JPL-Pub-83-35; DOE/JPL-1012-87; NAS 1.26:172862) Avail: NTIS HC A05/MF A01 CSCL 10A

Terrestrial photovoltaic modules must undergo substantial reductions in cost in order to become economically attractive as practical devices for large scale production of electricity. Part of the cost reductions must be realized by the encapsulation materials that are used to package, protect, and support the solar cells, electrical interconnects, and other ancillary components. As many of the encapsulation materials are polymeric, cost reductions necessitate the use of low cost polymers. The performance and status of ethylene vinyl acetate, a low cost polymer that is being investigated as an encapsulation material for terrestrial photovoltaic modules, are described. S.L.

N83-29810*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
NASA REDOX PROJECT STATUS SUMMARY
Norman H. Hagedorn Apr. 1983 13 p Presented at the 5th Battery and Electrochem. Contractors' Conf., Arlington, Va., 7-9 Dec. 1982; sponsored by DOE
(Contract DE-AI04-80AL-12726)
(NASA-TM-83401; E-1679; DOE/NASA/12726-22; NAS 1.15:83401) Avail: NTIS HC A02/MF A01 CSCL 10C

This report is a summary of the results of the Redox Project effort during FY 1982. It was presented at the Fifth U.S. Department of Energy Battery and Electrochemical Contractors Conference, Arlington, Va., Dec. 7-9, 1982. The major development during 1982 was the shift from Redox system operation at 25 C with unmixed reactants to operation at 65 C with mixed reactants. This change has made possible a two- or three-fold increase in operating current density, to about 65 mA/sq cm, and an increase in reactant utilization from 40% to about 90%. Both of these improvements will lead to significant system cost reductions. Contract studies have indicated that Redox reactant costs also will be moderate. A new catalyst for the chromuim electrode offers all the advantages of the conventional gold-lead catalyst while being easier to apply and more forgiving in use. Author

N83-29811*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
COMPARISON OF ROAD LOAD SIMULATOR TEST RESULTS WITH TRACK TESTS ON ELECTRIC VEHICLE PROPULSION SYSTEM Final Report
Miles O. Dustin Jun. 1983 18 p refs
(Contract DE-AI01-77CS-51044)
(NASA-TM-83393; E-170; DOE/NASA/51044-30; NAS 1.15:83393) Avail: NTIS HC A02/MF A01 CSCL 13F

A special-purpose dynamometer, the road load simulator (RLS), is being used at NASA's Lewis Research Center to test and evaluate electric vehicle propulsion systems developed under

DOE's Electric and Hybrid Vehicle Program. To improve correlation between system tests on the RLS and track tests, similar tests were conducted on the same propulsion system on the RLS and on a test track. These tests are compared in this report. Battery current to maintain a constant vehicle speed with a fixed throttle was used for the comparison. Scatter in the data was greater in the track test results. This is attributable to variations in tire rolling resistance and wind effects in the track data. It also appeared that the RLS road load, determined by coastdown tests on the track, was lower than that of the vehicle on the track. These differences may be due to differences in tire temperature. Author

N83-29812*# Boeing Engineering and Construction Co., Seattle, Wash.
MOD-2 WIND TURBINE SYSTEM DEVELOPMENT. VOLUME 1: EXECUTIVE SUMMARY Final Report
Sep. 1982 37 p
(Contracts DEN3-2; DE-AI01-82ET-20305)
(NASA-CR-168006; DOE/NASA/0002-1; NAS 1.26:168006) Avail: NTIS HC A03/MF A01 CSCL 10B

The development of the MOD-2 wind turbine through acceptance testing and initial operational evaluation is documented. Pitch control hydraulic system, yaw control system, drive train, electrical power station, control system, operations and maintenance experience, and availability are discussed. Author

N83-29813*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
RESULTS OF FREE YAW TESTS OF THE MOD-O 100 KILOWATT WIND TURBINE
John C. Glasgow and Robert D. Corrigan 1983 20 p refs Presented at the 6th Biennial Wind Energy Conf. and Workshop, Minneapolis, 1-3 Jun. 1983
(Contract DE-AI01-76ET-20320)
(NASA-TM-83432; DOE/NASA/20320-46; E-1724; NAS 1.15:83432) Avail: NTIS HC A02/MF A01 CSCL 10A

Tests were conducted on the Mod-O 100 kW experimental wind turbine to provide data on yaw alignment characteristics of a large horizontal axis wind turbine with its yaw restraint removed (i.e., in free yaw). The wind turbine consisted of a downwind horizontal axis rotor mounted on a tubular tower. Three rotor configurations were tested. Each rotor was teetered, coned 3 deg and tip-controlled. Two of the rotors had pitch-flap coupling or Delta-3, and one rotor had none. The two rotors with Delta-3 differed in the airfoil used in the tip sections. Test results indicate the rotor without pitch-flap coupling did not align closer than 25 deg with the wind, and pitch-flap coupling improved the wind turbine's alignment with the wind. Yaw damping was shown to have a favorable effect on free yaw characteristics. The change in the tip airfoil section was shown to affect the free yaw alignment also. The rotors with Delta-3 were shown to be capable of responding to wind shifts and exhibited stable operating properties. Author

N83-29814# Aerojet Energy Conversion Co., Sacramento, Calif.
HYDRODYNAMIC/KINETIC REACTIONS IN LIQUID-DOMINATED GEOTHERMAL SYSTEMS Final Report, Apr. 1979 - Apr. 1981
J. P. Nesewich and C. M. Gracey Apr. 1982 233 p refs
(Contract W-7405-eng-36)
(DE82-017287; DOE/NBM-2017287) Avail: NTIS HC A11/MF A01

A mobile geothermal well-site test unit at the Mercer 2 well in South Brawley, California (Imperial Valley), was constructed and tested. The equipment controlled, monitored, and recorded all process conditions of single- and dual-flash power cycles. Single and two-phase flashed brine effluents were flowed through piping component test sections to provide hydrodynamic/kinetic data for scale formation. The unit operated at flowrates in excess of 200 gpm and is designed to accommodate flowrates up to 300 gpm. Primary scale formations encountered were those of PbS, Fe2(OH)3Cl (iron hydroxychloride), iron chlorides, and non-crystalline forms of SiO2. The formation of iron hydroxychloride was due to the unusually high concentration of iron in the wellhead brine (5000 mg/l). DOE

N83-29815# El Paso Electric Co., Tex.
NEWMAN UNIT 1 ADVANCED SOLAR REPOWERING ADVANCED CONCEPTUAL DESIGN Final Report
Apr. 1982 361 p 2 Vol.
(Contract DE-AC03-81SF-11566)
(DE82-014899; DOE/SF-11566/2-VOL-1) Avail: NTIS HC A16/MF A01

The Newman Unit 1 solar repowering design is a water/steam central receiver concept supplying superheated steam. System level functional requirements, design, operation, performance, cost, safety, environmental, institutional, and regulatory considerations are described. Subsystems described include the collector, receiver, fossil energy, electrical power generating, and master control subsystems, site and site facilities. The conceptual design, cost, and performance of each subsystem is discussed at length. A detailed economic analysis of the repowered unit is made to realistically assess the economics of the first repowered unit using present cost data for a limited production level for solar hardware. Finally, a development plan is given, including the design, procurement, construction, checkout, startup, performance validation, and commercial operation. DOE

N83-29816# El Paso Electric Co., Tex.
NEWMAN UNIT 1 ADVANCED SOLAR REPOWERING Final Report
Apr. 1982 155 p refs 2 Vol.
(Contract DE-AC03-81SF-11566)
(DE82-014898; DOE/SF-11566/2-VOL-2) Avail: NTIS HC A08/MF A01

The five appendices give the selection process and system specification of the Newman Unit 1 solar repowering system. The conceptual design drawings and diagrams; input data for the simulation program; and a review of the most important characteristics of the existing plant are included. DOE

N83-29817# General Electric Co., St. Petersburg, Fla. Neutron Devices Dept.
COMPATIBILITY AND ACCELERATED AGING STUDY FOR Li(Si)FeS2 THERMALLY ACTIVATED BATTERIES
R. L. Poole, J. W. Mead (Sandia Labs., Albuquerque, N. Mex.), J. Q. Searcy (Sandia Labs., Albuquerque, N. Mex.), and P. A. Neiswander (Sandia Labs., Albuquerque, N. Mex.) 1982 18 p refs Presented at the 30th Power Sources Symp., Atlantic City, Jun. 1982
(Contract DE-AC04-76DP-00789)
(DE82-009026; CONF-820621-2) Avail: NTIS HC A02/MF A01

Thermally activated batteries using the Li(Si)/FeS2 system are being developed by Sandia National Laboratories. These components ae used in systems which require a storage life of 25 years and high reliability. A previous aging study was completed on this system, but no organic materials other than those in the electrical match and heat paper fuse strips were included. The present study incorporates all of the materials in the system, both organic and inorganic, except for the electric match and heat paper. There are two main parts in this study: (1) a compatibility study in which the four organic materials under investigation are placed in a hermetically sealed stainless steel container with battery components; (2) an aging study of pairs of material and individual materials in which one organic material is placed in a hermetically sealed stainless steel container with battery components. The compatibility study examines effects of some materials upon others (outgassing, etc.) which would cause degradation and/or functional failure. DOE

N83-29818# Data Resources, Inc., Lexington, Mass.
RESIDENTIAL DEMAND FOR ENERGY. VOLUME 1: RESIDENTIAL ENERGY DEMAND IN THE US Final Report
L. D. Taylor, G. R. Blattenberger, and R. K. Rennhack Apr. 1982 180 p refs Sponsored by EPRI
(EPRI Proj. 1098)

(DE82-903277; EPRI-EA-1572-Vol-1) Avail: NTIS HC A09/MF A01

Updated and improved versions of the residential energy demand models that are currently used in EPRI's Demand 80/81 Model are presented. The primary objective of the study is the development and estimation of econometric demand models that take into account in a theoretically appropriate way the problems caused by decreasing-block pricing in the sale of electricity and natural gas. An ancillary objective is to take into account the impact on electricity, natural gas, and fuel oil demands of differences and changes in the availability of natural gas. Econometric models of residential demand are estimated for all three fuel tyes using time series data by state. Price and income elasticities for a number of alternative models are presented. DOE

N83-29819# Los Alamos Scientific Lab., N. Mex.

ELECTROCHEMISTRY OF FUEL CELLS FOR TRANSPORTATION APPLICATIONS

E. R. Gonzalez and S. Srinivasan 1982 7 p refs Presented at the World Hydrogen Energy Conf., Pasadena, Calif., 13-17 Jun. 1982

(Contract W-7405-eng-36)

(DE82-008115; LA-UR-82-417; CONF-820605-9) Avail: NTIS HC A02/MF A01

Fuel cells are the most promising power sources for electric vehicles and do not suffer the inherent limitations of efficiency, energy density, and lifetime, and encountered with all types of batteries considered for this application. The projected performance of fuel-cell-powered vehicles is comparable to that of the internal combustion and diesel engine vehicles but with the additional advantages of higher fuel efficiency, particularly with synfuels from coal. The ideal fuel for a fuel cell power plant for electric vehicles is methanol. This fuel is reformed to hydrogen, which combines with oxygen from the air in an acid electrolyte (phosphoric, solid polymer, or superacid) fuel cell to produce electricity. Though the phosphoric acid fuel cell is in the most advanced state of development (mainly for power generation applications), the solid polymer and superacid electrolyte fuel cells are more promising for the transportation application because of the faster oxygen reduction kinetics (and hence potential for higher power densities) and shorter start-up times. DOE

N83-29820# Massachusetts Inst. of Tech., Cambridge. Energy Lab.

EVALUATION OF THE ORNL RESIDENTIAL ENERGY-USE MODEL Interim Report

D. McFadden Jun. 1982 153 p refs Sponsored by EPRI

(EPRI Proj. 1484)

(DE82-905768; EPRI-EA-2442) Avail: NTIS HC A08/MF A01

The architecture, empirical foundation, and applications of the Oak Ridge National Laboratory (ORNL) Residential Energy Use Model are valuated. A particular effort is made to identify the strengths and shortcomings of the model for alternative uses and to identify areas where model structure and empirical support could be upgraded. Concrete suggestions are made for improving model logic, strengthening the empirical basis for behavioral and technical parameters, and reducing the biases in the model that arise from aggregation. The overall conclusion is that the model has the potential to provide adequate forecasts, at a regional or national level, of the aggregate impacts of policies whose effects on households are relatively homogeneous. There are a number of model changes which would be relatively easy to implement and which should substantially improve forecasts of this sort. The version of the ORNL model reviewed here makes it fundamentally unsuitable for applications to geographical areas smaller than DOE regions or to policies that have a heterogeneous impact on households. DOE

N83-29821# Eagle-Picher Industries, Inc., Seneca, Mo. Commercial Products Dept.

MAINTENANCE-FREE 100 AMPERE-HOUR, LEAD ACID BATTERY FOR DEEP DISCHARGE, PHOTOVOLTAIC APPLICATIONS Report, 1 Oct. 1980 - 30 Nov. 1981

Charles Farris Jun. 1982 56 p

(Contract DE-AC04-76DP-00789)

(DE82-018633; SAND-82-7060) Avail: NTIS HC A04/MF A01

A new 6-volt 100 AH totally maintenance-free lead-acid battery was developed for deep discharge photovoltaic applications. During this 14-month cntract, notable accomplishments are described. Improvement was made in cycle life of 100 AH batteries with horizntal plae orientation. This improvement corroborates prior art work on the horizontal configuraton as applies to cycle life. Eagle-Picher had instituted this work earlier on the 15 AH size CAREFREE battery. The reason for the enhanced performance horizontally is more consistent quantity of electrolyte available along the plate surface. This eliminate preferential electrochemical reaction at any part of the plate surface. Also the horizontal orientation elimates stratification of electrolyte specific gravity which can occur on vertical oriented batteries. A substantial improvement in cycle life using the partial-state-of-charge cycling routine as conceived by Sandia was demonstrated. DOE

N83-29822# Purdue Univ., Lafayette, Ind. Lab. of Renewable Resources Engineering.

DIRECT ENZYMATIC EXTRACTION OF STARCH FROM CORN AS AN ENERGY-SAVING ALTERNATIVE TO PRODUCTION OF HIGH-FRUCTOSE SYRUP Quarterly Report, 1 Jan. - 31 Mar. 1981

1982 15 p

(Contract DE-AS02-78CS-40071)

(DE82-008314; DOE/CS-40071/21) Avail: NTIS HC A02/MF A01

The liquefaction of pre-gelatinized starch was studied with various analytical techniques to determine the effects of starch molecular weight, granule structure, granule size, and mechanical depolymerization. Also, improvements were made in the chromatographic system used to characterize starch hydrolysates. Progress is reported on protein removal. The effects of pH, temperature, and ionic strength were examined for the removal of protein from a syrup stream by adsorption on a phenolic resin. Buffered systems, which maintain more stable pH values, were also examined. Mathematical modeling of the results is in progress. The pilot plant facility is complete and in operation. Starch streams containing 1% protein are being produced by the protein extraction process. DOE

N83-29823# Sandia Labs., Albuquerque, N. Mex. Fluid and Thermal Sciences Dept.

AN EXPERIMENTAL STUDY OF SINGLE MEDIA THERMOCLINE THERMAL-ENERGY STORAGE

R. J. Gross 1982 37 p refs Presented at the AIAA/ASME Conf., St. Louis, 7-11 Jun. 1982

(Contract DE-AC04-76DP-00789)

(DE82-006769; SAND-81-2580C; CONF-820604-3) Avail: NTIS HC A03/MF A01

Experiments were conducted on a 1200 gallon single medium thermocline facility to determine the feasibility of the thermocline thermal energy storage concept on a large scale and to determine the relative importance of each of the five heat loss mechanisms present in such a system. The results of heat loss tests, static thermocline cool down tests and charge/discharge tests are presented. A simple one-dimensional model is proposed for the prediction of the temperature field during a cool down test in which a thermocline is present. The model agrees well with experiment. DOE

N83-29824# Department of Energy, Washington, D. C. Office of Market Analysis.

INTERNATIONAL ENERGY INDICATORS, FEBRUARY - MARCH 1982

Edward Rossi, Jr., ed. 1982 30 p

(DE82-014879; DOE/IA-0010/18) Avail: NTIS HC A03/MF A01

Data are compiled and graphs are presented for: world crude oil production, 1974 to 1981; OPEC crude oil productive capacity; world crude oil and refined product inventory levels; 1975 to 1981; oil consumption in OECD countries, 1975 to 1981; USSR crude

oil production and exports, 1975 to 1981; free world and US nuclear electricity generation, 1973-currrent capacity; US domestic oil supply, 1977 to 1981; US gross imports of crude oil and products, 1973 to 1981; landed cost of Saudi crude current and 1974 dollars; US coal trade, 1975 to 1981; US natural gas trade, 1975 to 1981; summary of US merchandise trade, 1977 to 1981; and energy/gross national product ratio. DOE

N83-29825# New Mexico State Univ., Las Cruces. Solar Energy Inst.

ESTABLISHMENT AND FURNISHING OF THE PHOTOVOLTAIC CENTER FOR THE SOUTHWEST RESIDENTIAL EXPERIMENT STATION Final Report, 3 Jul. 1980 - 30 Sep. 1981

Harry S. Zwibel and John F. Schaefer Apr. 1982 25 p
(DE82-904018; NP-2904018; EMD-2-68-2233) Avail: NTIS HC A02/MF A01

A building to serve as the operations, data gathering, and administrative complex and visitor center for the Southwest Residential Experiment Station (SW RES) was designed, constructed, and furnished as a cost-shared portion of a multiyear effort by the New Mexico Solar Energy Institute to establish and operate the SW RES for the Department of Energy National Photovoltaic Center Program. The 3000-square-foot building, called the Photovoltaic Center, houses a Visitor Center, shop area, offices, rest rooms, and a large data collection room. The passive solar design includes Earth berms, glazing along the southwest wall of the building and thermal mass in 55-gallon drums filled with water to store heat from solar radiation entering the building. The building is located on the New Mexico State University campus in Las Cruces. DOE

N83-29826# Los Alamos Scientific Lab., N. Mex.

PASSIVE SOLAR CONCEPTS FOR MULTISTORY BUILDINGS

J. Douglas Balcomb 1982 5 p refs Presented at the Am. Sect. of the Intern. Solar Energy Soc. Conf., Houston, Tex., 1-5 Jun. 1982
(Contract W-7405-eng-36)
(DE82-012139; LA-UR-82-878; CONF-820629-3) Avail: NTIS HC A02/MF A01

Multistory buildings long in the east-west direction and short in the north-south direction offer good opportunity for passive solar application. If each unit within the building is designed so that the solar savings fraction is the same, each will respond to the weather the same way and no unit to unit heat distribution is needed. A numerical example for Denver is given indicating excellent thermal performance and a several day thermal response time. Solutions involving distribution of heat from unit to unit are also discussed as well as top floor and south wall variations. DOE

N83-29827# Oak Ridge National Lab., Tenn. Engineering Technology Div.

FIXED-BASE FLYWHEEL STORAGE SYSTEMS FOR ELECTRIC-UTILITY APPLICATIONS: AN ASSESSMENT OF ECONOMIC VIABILITY AND R AND D PRIORITIES

M. Olszewski and R. S. Steele Feb. 1983 45 p refs
(Contract W-7405-eng-26)
(DE83-007171; ORNL/TM-8391) Avail: NTIS HC A03/MF A01

Electric utility side meter storage options were assessed for the daily 2 h peaking spike application. The storage options considered included compressed air, batteries, and flywheels. The potential role for flywheels in this application was assessed and research and development (R and D) priorities were established for fixed base flywheel systems. Results of the worth cost analysis indicate that where geologic conditions are favorable, compressed air energy storage (CAES) is a strong competitor against combustion turbines. Existing battery and flywheel systems rated about equal, both being, at best, marginally uncompetitive with turbines. Advanced batteries, if existing cost and performance goals are met, could be competitive with CAES. A three task R and D effort for flywheel development appears warranted. The first task, directed at reducing fabrication coss and increasing performance of a chopped fiber, F-glass, solid disk concept, could produce a competitive flywheel system. DOE

N83-29828# Midwest Research Inst., Golden, Colo. Thermal Research Branch.

ANALYSIS OF THE ADSORPTION PROCESS AND OF DESICCANT COOLING SYSTEMS: A PSEUDO STEADY-STATE MODEL FOR COUPLED HEAT AND MASS TRANSFER

Robert S. Barlow Dec. 1982 154 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE83-005752; SERI/TR-631-1330) Avail: NTIS HC A08/MF A01

A computer model to simulate the adiabatic adsorption/desorption process is documented. Developed to predict the performance of desiccant cooling systems, the model has been validated through comparison with experimental data for single-blow adsorption and desorption. A literature review on adsorption analysis, detailed discussions of the adsorption process, and an initial assessment of the potential for performance improvement through advanced component development are included. DOE

N83-29829# AiResearch Mfg. Co., Torrance, Calif.

DEVELOPMENT OF A SOLAR-DESICCANT DEHUMIDIFIER, PHASE 2 Final Summary Report, 1 Sep. 1980 - 31 Mar. 1982

J. Rousseau 1 Nov. 1982 51 p refs
(Contracts DE-AC03-77CS-31591; EG-77-C-03-1591)
(DE83-005407; DOE/CS-31591/T8) Avail: NTIS HC A04/MF A01

The solar desiccant air conditioner (SODAC), its operation, characteristics of the major components, performance at design conditions, and the control schemes fo optimum operation in various climates are described for both recirculated and ventilated configurations, with greater emphasis on the recirculated configuration. The development testing and the determination of the SODAC performance in both configurations over the entire range of interfacing parameters are reported. DOE

N83-29830# Midwest Research Inst., Golden, Colo. Thermal Systems and Engineering Branch.

BEHAVIOR OF NINE SOLAR-POND CANDIDATE SALTS

Daniel Schell and Cecile M. Leboeuf Jan. 1983 35 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE83-006029; SERI/TR-253-1512) Avail: NTIS HC A03/MF A01

Several highly soluble salts were tested for their suitability as solar pond materials in a laboratory salinity gradient pond. Each salt's performance was compared with the performance of sodium chloride, the most commonly used salt in ponds. Predictions of stability were made and compared with experimentally derived stability as determined by the growth of convective layers. The investigators observed good agreement between experimental and theoretical ranking of the stability of each salt. However, it was apparent that more extensive information on the properties of candidate salt solutions was needed. Sodium carbonate, magnesium chloride, and calcium chloride exhibited greater stability than sodium chloride at the same concentration gradient. Ammonium nitrate, potassium nitrate, and potassium chloride showed less stability than sodium chloride at the same concentration gradient. The latter three salts are soluble enough to achieve the same stability as sodium chloride, but only if the concentration gradient is increased. DOE

N83-29831# Midwest Research Inst., Golden, Colo. Building Systems Research Branch.

MEASURED PERFORMANCE RESULTS: LOW-COST SOLAR WATER HEATING SYSTEMS IN THE SAN LUIS VALLEY

Joel Swisher Jan. 1983 41 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE83-006488; SERI/TR-254-1727) Avail: NTIS HC A03/MF A01

The measured performance of seven low-cost solar water heating systems in the San Luis Valley of southern Colorado is summarized. During the summer and fall of 1981, SERI monitored a variety of low-cost solar water heating system designs and components. Five systems had site-built collectors, and four included low-cost tank-in-jacket heat exchanger/storage tank

components. Two were air-to-water systems. The five liquid-based systems included a drain-down design, a propylene glycol-charged thermosiphon system, and three pumped-glycol systems. The pumped-liquid systems performed the best, with system efficiencies greater than 20% and solar fractions between 40% and 70%. The air-to-water systems did not perform as well because of leakage in the collectors and heat exchangers. The thermosiphon system performed at lower efficiency because the collector flows were low. DOE

N83-29832# Texas Technological Univ., Lubbock.
CROSBYTON SOLAR POWER PROJECT. VOLUME 8: PRELIMINARY DESIGN OF 55-MWe SOLAR-FOSSIL HYBRID ELECTRIC POWER PLANT AT CROSBYTON, TEXAS
4 Feb. 1982 644 p
(Contract DE-AC04-76ET-20255)
(DE83-005285; DOE/ET-20255/T1) Avail: NTIS HC A99/MF A01

This report presents the preliminary design and the construction cost for a 5 MWe Solar Hybrid Electric Energy Plant (SHEEP) to be built at Crosbyton, Texas. The plant has been designed to serve as a small size, commercially operable power plant which fully demonstrates the function, performance, and cost of this solar technology and integrated steam management concept. Good lifetime performance at minimum cost were the critical design objectives. The major solar components of this plant are ten 203 foot diameter stationary tilted quartersphere solar bowls. Each with a slender 58 foot solar receiver which tracks the solar focus produced by the bowl. At peak insolation the ten bowls will produce sufficient steam to generate 5 MWe. This plant has only a few minutes of thermal storage capability. The plant has a fossil boiler (oil or gas fired) which is integrated into the solar-turbine steam loop to provide supplemental steam for electric generation at night or during periods of low insolation. DOE

N83-29833# National Bureau of Standards, Boulder, Colo. Electromagnetic Fields Div.
EMI FROM SOLAR PANELS AND INVERTERS
Jan. 1983 26 p
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE83-006028; SERI/STR-214-1730) Avail: NTIS HC A03/MF A01

Results are given of an exploratory investigation to ascertain the potential of electromagnetic interference (EMI) caused by radiation from photovoltaic (PV) systems. This includes a determination of the appropriate parameters to be measured and a review of present standards with emphasis on the FCC docket on incidental radiators. It also includes small residential installations having roof-mounted PV arrays. The results will be used to make recommendations as to what further work, if any, is needed to ensure that EMI from a PV system is negligible. Measured data so far show that the inverters in the solar-panel system tested caused severe EMI problems in the AM broadcast band (0.5 to 1.6 MH2), while FM and television reception was not significantly affected. DOE

N83-29834# Boeing Computer Services, Inc., Seattle, Wash.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE REPORT FOR G. N. WILCOX MEMORIAL HOSPITAL, KAUAI, HAWAII FOR OCTOBER 1982, VOLUME 6
Jan. 1983 28 p
(Contract DE-AC04-76DP-00789)
(DE83-006415; SAND-81-7080/6) Avail: NTIS HC A03/MF A01

Presented are the data accumulated during October 1982 at the intermediate project at G.N. Wilcox Memorial Hospital, Kauaki, Hawaii. Generated energy and environmental (weather) data are presented graphically. Explanations of irregularities not attributable to weather are provided. DOE

N83-29835# Sandia Labs., Albuquerque, N. Mex. Advanced Systems Div.
MANUFACTURING AND COST ANALYSES OF HELIOSTATS BASED ON THE SECOND-GENERATION HELIOSTAT-DEVELOPMENT STUDY
H. F. Norris, Jr. and S. S. White Dec. 1982 309 p refs
(Contract DE-AC04-76DP-00789)
(DE83-006664; SAND-82-8007) Avail: NTIS HC A14/MF A01

The manufacturing processes and users' costs were analyzed for the second generation heliostats. Mass production scenarios are examined by comparison and manufacturing analysis, including facility site selection and design, operations, equipment and tooling, and labor. Different transportation scenarios are compared, as are the site assembly and installation procedures. Users' costs are allocated to the central manufacturing facility, to transportation from the central manufacturing facility to the field, and to the field sites. Costs are compared for the major components: reflective assembly, drive mechanism, controls and field wiring, foundation/pedestal, and support structure. Breakdowns are given for direct materials, direct labor, and other expenses including an estimate of the gross profit. A contractor estimated capital price to the utility for each heliostat design and estimated operations and maintenance expenses are shown. DOE

N83-29836# Geological Survey, Denver, Colo.
GEOTHERMAL-RESERVOIR ASSESSMENT AND CONFIRMATION PROGRAM FOR DIRECT-HEAT APPLICATIONS IN COLORADO Final Technical Report
Richard Howard Pearl Feb. 1983 27 p refs
(Contracts DE-AS07-77ET-28365; EG-77-C-07-1678)
(DE83-009816; DOE/ET-28365/27) Avail: NTIS HC A03/MF A01

The project description, required research project personnel, an annotated list of reports, and problems and recommendations are included. DOE

N83-29837# McDonnell-Douglas Astronautics Co., Huntington Beach, Calif.
ENVIRONMENTAL DEGRADATION OF SOLAR OPTICAL MATERIALS. VOLUME 1: LITERATURE SURVEY Final Report
V. L. Morris Nov. 1982 127 p refs 2 Vol.
(Contract DE-AC04-76DP-00789)
(DE83-010298; SAND-82-7068/1) Avail: NTIS HC A07/MF A01

Exposure of solar optical materials to real use environments which results in both physical degradation and chemical degradation of the material is discussed. These effects can decrease the appropriate optical property of the material and result in diminished solar system operating efficiency. The ultimate result is an increased cost for the energy produced, which diminishes the viability of solar energy as a competitor in the energy market. Degradative mechanisms and monitoring the realtime effects of exposing these materials to typical solar system environments were evaluated. A review of available literature on the environmental degradation of solar optical materials, exposed to real or simulated solar use environments, is summarized. The physical and chemical degradative effects of the exposure environment on the optical materials proposed for or used in active solar energy systems are emphasized. The optical materials were both transmitting and reflecting. Additionally, techniques for monitoring degradation effects and methods for evaluating the appropriate optical properties are reviewed. DOE

N83-29838# Sandia Labs., Albuquerque, N. Mex. Applied Mechanics Div.
INFLUENCE OF ADHESIVE SHEAR DEFORMATION ON LAMINATE STRUCTURAL BEHAVIOR WITH APPLICATION TO PARABOLIC TROUGH SOLAR COLLECTORS
David B. Clauss and Robert C. Reuter, Jr. Feb. 1983 44 p refs
(Contract DE-AC04-76DP-00789)
(DE83-010293; SAND-82-1825) Avail: NTIS HC A03/MF A01

A simplified theory for the bending behavior of a thin flat bilamina panel was developed which includes the effects of shear deformation in the central adhesive layer. Static equilibrium equations for elastic thermomechanical cylindrical bending of a thin plate are used. A solution form is proposed which greatly facilitates application of this theory to structural panels with

numerous discrete property changes in the variable direction. The influence of adhesive shear stiffness parameters upon overall laminate behavior is characterized through numerical examples typifying various thermal and mechanical loading conditions. DOE

N83-29839# Ames Lab., Iowa. Energy and Mineral Resources Research Inst.
PERFORMANCE OF LIVING HISTORY FARM'S SALT-GRADIENT SOLAR POND
Paul H. Sidles and Roy A. Kratz (Living History Farms) 1982 7 p Presented at the 4th Ann. Iowa Solar Operations Res. Conf., Des Moines, 21-22 Jun. 1982
(Contract W-7405-eng-82)
(DE83-009066; IS-M-402; CONF-8206174-1) Avail: NTIS HC A02/MF A01

The construction, operation, and performance of a solar pond for a residence on a prototype educational farm is described. DOE

N83-29840# Zeopower Co., Natick, Mass.
DEVELOPMENT OF LOW-COST INTEGRATED ZEOLITE COLLECTOR, SUPPLEMENT Final Report, 25 Sep. 1980 - 24 Sep. 1981
Dimiter I. Tchernev Feb. 1983 125 p
(Contract DE-AC03-78CS-32117)
(DE83-008484; DOE/CS-32117/2; SAN-2117-2) Avail: NTIS HC A06/MF A01

A low cost zeolite collector was built and the experimental data from the collectors at the different test sites in the USA were analyzed. The suitability of different methods of corrosion protection of low cost materials was studied. It is found that the phenolic coating which is suitable is more expensive than the copper it replaces. Fiber glass epoxy is suitable as a container material for the zeolite, however, there are some problems with the vacuum seal due to the mismatch of thermal expansion coefficients. Low cost collectors were constructed and tested. Cost reduction of a factor of six is possible in mass production. DOE

N83-29841# Purdue Univ., Lafayette, Ind. Lab. for Heat Transfer.
FORCED- AND NATURAL-CONVECTION STUDIES ON SOLAR COLLECTORS FOR HEATING AND COOLING APPLICATIONS Final Report
Joseph T. Pearson Mar. 1983 126 p refs
(Contracts DE-AC04-78CS-35366; EM-78-C-04-5366)
(DE83-009863; ALO-5366-4) Avail: NTIS HC A07/MF A01

Convection in air heating solar collectors for heating and cooling applications was studied. It was determined that improvement in the overall conductance between the absorber and the flowing air was an area that needed much improvement. Studies were performed to obtain several absorber convector configurations which have superior heat transfer performance, modest drop penalties, and a high potential for economical manufacturing. Four surfaces which may be fabricated from aluminum or steel are recommended. Three utilize corrugated sheets bonded to the backplate and/or the back side of the absorber. These three surfaces are recommended for applications where airflow behind the absorber is appropriate. For those applications where airflow above the absorber is appropriate, a louvered surface which can be fabricated from metal or plastic is recommended. DOE

N83-29842# Sandia Labs., Albuquerque, N. Mex. Solar Systems Applications Div.
SOLAR TOTAL ENERGY PROJECT SUMMARY DESCRIPTION
Robert W. Hunke and James A. Leonard Mar. 1983 20 p
(Contract DE-AC04-76DP-00789)
(DE83-010232; SAND-82-2249) Avail: NTIS HC A02/MF A01

The Solar Total Energy Project (STEP) at Shenandoah, GA is described. A summary description of the energy system, its location, and the project site are presented. The system is further described including design criteria and requirements, performance criteria, and operating requirements. The major subsystems of the STEP - the solar collection subsystem (SCS), the power conversion subsystem, the thermal utilization subsystem, the control and instrumentation subsystem, and the electrical subsystem are described, including their major components. Specific features of the control and instrumentation provisions for the system and subsystem operational modes are also described and the costs of construction presented. DOE

N83-29843# Sandia Labs., Albuquerque, N. Mex. Systems Evaluation Div.
THE 10-MWe CENTRAL-RECEIVER SOLAR-THERMAL PILOT-PLANT TEST OPERATION PLAN
J. S. Anderson and J. W. Smith Mar. 1983 197 p
(Contract DE-AC04-76DP-00789)
(DE83-009737; SAND-82-8025) Avail: NTIS HC A09/MF A01

Stable, controlled operation in each of the steady state operational modes and data for performance evaluation were demonstrated. The operational modes are tested, and transitions, emergency shutdowns, preliminary power production, and certain other plant characteristics are demonstrated. The tests define the conditions which will establish plant operation at a near optimum combination of annual energy output and O and M cost. Test specifications, containing specific test requirements, are provided for those tests that will be conducted during start up and the experimental test and evaluation phase of the pilot plant. DOE

N83-29844# Boeing Computer Services, Inc., Seattle, Wash.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE REPORT. VOLUME 6: CDC LIGHT MANUFACTURING BLDG., SAN BERNARDINO, CA FOR AUGUST 1982
Mar. 1983 28 p Prepared for Sandia National Labs.
(Contract DE-AC04-76DP-00789)
(DE83-010390; SAND-81-7089/6) Avail: NTIS HC A03/MF A01

Presented are the data accumulated during August at the intermediate photovoltaic project at the CDC Light Manufacturing Bldg., San Bernardino, California. Generated energy and environmental (weather) data are presented graphically. Explanations of irregularities not attributable to weather are provided. DOE

N83-29845# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
SERI BIOMASS PROGRAM Annual Technical Report, 1982
Paul W. Bergeron, Robert E. Corder, Andrew M. Hill, Hilde Lindsey, and Michael Z. Lowenstein Feb. 1983 89 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE83-009763; SERI/TR-231-1918) Avail: NTIS HC A05/MF A01

The biomass with which this report is concerned includes aquatic plants, which can be converted into liquid fuels and chemicals; organic wastes (crop residues as well as animal and municipal wastes), from which biogas can be produced via anerobic digestion; and organic or inorganic waste streams, from which hydrogen can be produced by photobiological processes. The Biomass Program Office supports research in three areas which, although distinct, all use living organisms to create the desired products. The Aquatic Species Program (ASP) supports research on organisms that are themselves processed into the final products, while the Anaerobic Digestion (ADP) and Photo/Biological Hydrogen Program (P/BHP) deals with organisms that transform waste streams into energy products. The P/BHP is also investigating systems using water as a feedstock and cell-free systems which do not utilize living organisms. This report summarizes the progress and research accomplishments of the SERI Biomass Program during FY 1982. DOE

N83-29846# California Univ., Berkeley. Lawrence Berkeley Lab. Chemical Biodynamics Div.
OIL FROM PLANTS
Melvin Calvin Jan. 1983 26 p refs Presented at the Beltsville Agr. Res. Center Sci. Seminar, Beltsville, Md., 8 Sep. 1982
(Contract DE-AC03-76SF-00098)
(DE83-009141; LBL-15678; CONF-8209123-1) Avail: NTIS HC A03/MF A01

As a result of the exhaustion of our supplies of ancient

photosynthesis (oil and gas) it is necessary to develop renewable fuels for the future. The most immediate source of renewable fuel is, of course, the annually growing green plants, some of which produce hydrocarbon(s) directly. New plant sources can be selected for this purpose, plants which have high potential for production of chemicals and liquid fuels. Suggestions are made for modification of both the product character and the productivity of the plants. Ultimately, a totally synthetic device will be developed for the conversion of solar quanta into useful chemical form completely independent of the need for arable land. DOE

N83-29847# Argonne National Lab., Ill.
OTEC PLANTS FOR TODAYS ISLAND MARKET
R. Niemann, F. Davis, L. Genens, D. Hillis, C. Panchal, N. Sather, H. Stevens, and A. Thomas 1982 7 p refs Presented at the 17th Intersoc. Energy Conversion Eng. Conf., Los Angeles, 8 Aug. 1982 Previously announced as A83-27227
(Contract W-31-109-eng-38)
(DE83-008670; CONF-820814-41) Avail: NTIS HC A02/MF A01

Design features of a proposed commercial 10 MWe OTEC power plant are presented. The plans rely on existing technology, with shore basing in Hawaii, NH3 in the coolant loop, a closed cycle, and a design life of 30 yr. Shell and the evaporators are adopted, together with periodic chlorination to prevent biofouling, and grid interconnect. Built with two 5 MWe modules, the OTEC system has hot and cold water pipes interfaced below sea level to wells, with one sea water pump for each heat exchanger. Ti tubes are featured in the evaporators and condensors. The 5300 ft cold water pipes descend to a 2100 ft depth, and are made of foam core fiberglass. The 350 ft warm water pipe has an intake at 35 ft depth and requires single wall fiberglass construction. The total plant cost is projected as $63.7 million, with power delivery costs of 17 cents/kWh. DOE

N83-29848# Ohio State Univ., Columbus.
FINITE-ELEMENT MODELING OF THERMO-MECHANICAL RESPONSES ASSOCIATED WITH UNDERGROUND COAL CONVERSION
Oak Key Min Feb. 1983 288 p refs
(Contracts DE-AS20-80LC-10335; DE-AS20-80LC-10886)
(DE83-006748; DOE/LC-10335/T1) Avail: NTIS HC A13/MF A01

The in situ gasification of coal has received increased international attention. Several technical, environmental, safety, and economic considerations were indicated as potential advantages. The controlled extraction of this resource requires laboratory experiments, mathematical modeling, and field tests. The prediction of temperature, stress and gasification chamber configuration is a prerequisite in evaluating process mechanisms, roof collapse, combustion stability, and optimization of commercial projects. The thermomechanical response is obtained by using the finite element method. The energy generated by the coal combustion at the burn front is quantitatively introduced in the heat conduction equation. The gasification chamber configuration is defined by an assumed reference front isotherm. Thermoelastic and thermoplastic constitutive relations along with failure criteria are used in predicting the failure fronts. The incorporation of the burn front propagation and the collapse of failed overburden determines the chamber configuration. DOE

N83-29849# Boeing Computer Services, Inc., Seattle, Wash.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE REPORT. LOVINGTON SQUARE SHOPPING CENTER, LOVINGTON, NEW MEXICO FOR NOVEMBER 1982, VOLUME 17
Jan. 1983 27 p
(Contract DE-AC04-76DP-00789)
(DE83-006721; SAND-81-7085/17) Avail: NTIS HC A03/MF A01

The data accumulated during November 1982 at the intermediate photovoltaic project at Lovington Square Shopping Center, Lovington, New Mexico, are presented. Generated energy and environmental (weather) data are presented graphically. Explanations of irregularities not attributable to weather are provided. DOE

N83-29850# Indiana State Hospital, Evansville. Dept. of Engineering Technology.
FEASIBILITY OF NIGHT-SKY RADIATION WITH HEAT PUMPS B.S. Thesis
Thomas G. McKinney 1982 31 p refs
(Contract DE-FG02-81R5-10298)
(DE83-006812; DOE/R5-10298/2) Avail: NTIS HC A03/MF A01

This report presents the procedure involved in the determination of the feasibility of high-sky radiation as the means of rejecting heat through solar collectors for a sample residential house in the Evansville area. It presents conclusions on different types of coatings that are used in solar collectors. It also designs the system, and its backup, in schematic form. For the purpose of cost analysis it discusses the difference of a cooling tower and night-sky radiation. DOE

N83-29851# Sandia Labs., Albuquerque, N. Mex. Enhanced Oil Recovery Div.
CONCEPTUAL DESIGN OF A DIRECT-CONTACT NATURAL-GAS-FIRED DOWNHOLE STEAM GENERATOR
James B. Moreno Jun. 1982 65 p refs
(Contract DE-AC04-76DP-00789)
(DE82-019875; SAND-82-0715) Avail: NTIS HC A04/MF A01

Conceptual designs are presented for three natural gas fueled, 1500 to 2000 psi, downhole steam generators: a 4 MMBtu/h unit sized for 7-inch casing, an 18.4 MMBtu/h unit sized for 7-inch casing, and an 18.4 MMBtu/h unit sized for 9-5/8 inch casing. Specifications for the support systems for each system are outlined, considering both 3650-foot and 7000-foot well depths. Costs for major components and confidence levels for each design are estimated. Design philosophy and procedures are given in sufficient detail to enable extrapolation of or interpolation between the three designs. DOE

N83-29852# Rocketdyne, Canoga Park, Calif.
DOWNHOLE STEAM-GENERATOR STUDY. VOLUME 2: DESIGN SUMMARY Progress Report, Sep. 1978 - Sep. 1980
Jun. 1982 28 p refs
(Contract DE-AC04-76DP-00789)
(DE82-019824; SAND-82-7009) Avail: NTIS HC A03/MF A01

A detailed design of a low pressure combustion, indirect contact, downhole steam generator was prepared. The design is based on analysis and experiments conducted previously (reported in Vol. I). The generator is sized to operate in a 7-inch casing and deliver 350 bbl/d of 80% quality steam at a pressure of 1500 psia. Included in this report are a description of the design, the expected range of operating conditions, and a suggested installation procedure. DOE

N83-29853# Los Alamos Scientific Lab., N. Mex.
INTRINSICALLY IRREVERSIBLE HEAT ENGINES
John C. Wheatley 1982 27 p refs Presented at the Near Zero Conf., Stanford, Calif., 24 Mar. 1982
(Contract W-7405-eng-36)
(DE82-015729; LA-UR-82-1427; CONF-820372-1) Avail: NTIS HC A03/MF A01

The concept of an intrinsically irreversible heat engine is examined as a means of obtaining temperatures near absolute zero. These engines use the irreversible process of thermal conduction to achieve the necessary phasing between temperature changes and motion of a primary medium and therefore have only one moving mechanical element. DOE

N83-29854# Vitro Labs., Silver Spring, Md.
SOLAR ENERGY SYSTEM PERFORMANCE EVALUATION. SCOTTSDALE COURTHOUSE, SCOTTSDALE, ARIZONA, MARCH, APRIL, JULY, AUGUST, AND OCTOBER 1981 THROUGH FEBRUARY 1982
P. E. Wetzel 1982 76 p refs
(Contract DE-AC01-79CS-30027)

(DE82-019030; SOLAR/2055-82/14) Avail: NTIS HC A05/MF A01

The site is the County Courts Building in Scottsdale, Arizona. Its active solar energy system is designed to supply 100% of the heating and 60% of the cooling load. The system consists of 2723 square feet of concentrating collectors, 5000 gallons of hot water storage, 25.5-ton absorption chiller, and backup electric resistance heating and a 25-ton electric reciprocating vapor-compressor chiller. The system performed far below design expectations due to the extremely poor performance of the collector array. Performance data given include the solar fraction, solar savings ratio, conventional fuel savings, and coefficient of performance. Monthly performance data are tabulated for the solar system and for each subsystem. Also given are monthly solar operating energy, energy savings, and weather conditions for each month. Typical system operation data are graphed and a typical operating sequence is given. Among the appendices are a brief system description, the performance evaluation techniques, typical monthly data, long-term weather data, and a brief discussion of sensor technology. DOE

N83-29855# Vitro Labs., Silver Spring, Md.
SOLAR ENERGY SYSTEM PERFORMANCE EVALUATION. CROWN REALTY 1, LAKEWOOD, COLORADO, DECEMBER 1981 THROUGH MARCH 1982
K. M. Welch 1982 77 p refs
(Contract DE-AC01-79CS-30027)
(DE82-019029; SOLAR/2089-82/14) Avail: NTIS HC A05/MF A01

The Crown Realty 1 site is a small office building in Colorado. Its active solar space heating system is equipped with 907 square feet of liquid flat-plate collectors, 2500-gallon water storage tank, and several solar-assisted heat pumps with electric resistance strip auxiliary heating. Solar system performance data given include the solar fraction solar savings ratio, conventional fuel savings, system performance factor and coefficient of performance. Although the solar fraction was 29%, the solar savings ratio reflects a 9% penalty due to operating energy expense. Monthly system performance data are tabulated, as well as performance data for each subsystem - the collector, storage, and space heating subsystems. Monthly solar operating energy, energy savings, and weather conditions data are also tabulated. Typical system operation data are also graphed and discussed, as is solar energy utilization. Among the appendices are a system description, performance evaluation techniques, typical monthly data, long-term weather data, and a brief discussion of the sensor technology. DOE

N83-29856# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
HEAT AND MASS EXTRACTION FROM SOLAR PONDS: ANALYSIS AND DEVELOPMENT OF A LABORATORY FACILITY
Federica Zangrando Apr. 1982 51 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-013888; SERI/TR-252-1569) Avail: NTIS HC A04/MF A01

An analytical and experimental investigation is being performed of heat and mass extraction from a solar pond by recirculating hot brine from the storage layer through an external heat exchanger. This process consists of continuous of intermittent recirculation of fluid from an initially convective layer. This layer is bounded above by a stratified region (gradient), although there is no physical partition separating these two regions, and it is bounded below by a horizontal plane (bottom of the pond) which is periodically heated by the sunlight penetrating to this depth and absorbed on the plane. Additionally, intermittent volumetric heating occurs in the bulk of the pond as a result of radiation absorption. Accomplishments in the first year of this effort include: reviewing the literature on the subject of heat and mass extraction from the storage layer of salt gradient solar pond and related topics; defining possible extraction processes; identifying the parameters which limit the extraction rate on the basis of gradient stability; presenting a simple analytical model of the extraction processes; designing a suitable laboratory test facility; and defining specific measurements to be performed and accuracy requirements. DOE

N83-29857# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
SOLAR STORAGE FOR PROCESS HEAT AND BUILDING APPLICATION: A REVIEW OF PRIOR ASSESSMENTS
Thomas A. Kriz and C. J. Swet Aug. 1982 113 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-019791; SERI/TR-231-1595) Avail: NTIS HC A06/MF A01

Thermal energy storage is a prime candidate for use with solar thermal heat generating systems. Eighty reports on the use of thermal energy storage for solar thermal applications that provide building heating and cooling and hot water are reviewed. Thirteen reports on process heat applications of these technologies are also reviewed. The reports are systematically critiqued with regard to essential findings and the types of systems studied. Ground rules, such as application parameters and simulations, are listed. Since the report is issued as a prelude to analysis completed later in the task, the adequacy of each prior study is discussed vis-a-vis the later work. DOE

N83-29858# Sandia Labs., Albuquerque, N. Mex.
THE DEPARTMENT OF ENERGY (DOE) RESEARCH PROGRAM IN STRUCTURAL ANALYSIS OF VERTICAL-AXIS WIND TURBINES
W. N. Sullivan 1982 26 p refs Presented at the 4th Intern. Symp. on Wind Energy Systems, Stockholm, 21 Sep. 1982
(Contract DE-AC04-76DP-00789)
(DE82-017072; SAND-82-1378C; CONF-820922-1) Avail: NTIS HC A03/MF A01

The Darrieus-type Vertical Axis Wind Turbine (VAWT) presents a variety of unusual structural problems to designers. The level of understanding of these structural problems governs, to a large degree, the success or failure of today's rotor designs. A survey is presented of the technology available for rotor structural design with emphasis on the DOE research program now underway. Itemizations are included of the major structural issues unique to the VAWT along with discussion of available analysis techniques for each problem area. It is concluded that tools are available to at least approximately address the most important problems. However, experimental data for confirmation is rather limited in terms of volume and the range of rotor configurations tested. DOE

N83-29859# Battelle Pacific Northwest Labs., Richland, Wash.
AN ASSESSMENT OF SECOND-GENERATION COMPRESSED-AIR ENERGY-STORAGE CONCEPTS
F. R. Zaloudek and R. W. Reilly Jul. 1982 85 p refs
(Contract DE-AC06-76RL-01830)
(DE82-019513; PNL-3978) Avail: NTIS HC A05/MF A01

The Pacific Northwest Laboratory (PNL) conducted an assessment of the adiabatic compressed air energy storage (CAES), hybrid CAES, CAES with coal gasification, and CAES with pressurized fluidized bed combustion concepts based on information provided in conceptual design studies. The PNL assessment covered consideration of the technological readiness, relative economic benefits, and operational viability of each concept. It was concluded that the adiabatic CAES concept appears to be the most attractive candidate for utility application in the near future. It is operationally viable, economically attractive compared with competing concepts, and will require relatively little additional development before plant construction can be undertaken. It was estimated that a utility could start the design of a demonstration plant in 2 to 3 years if research regarding thermal energy storage system design is undertaken in a timely manner. DOE

N83-29860# Sandia Labs., Albuquerque, N. Mex. Exploratory Batteries Div.
MATERIAL PROBLEMS IN LITHIUM, AMBIENT-TEMPERATURE, PRIMARY BATTERIES
Rod K. Quinn and Samuel C. Levy 1982 9 p Presented at the Electron. Components Conf., Atlanta, 11 May 1981

(Contract DE-AC04-76DP-00789)
(DE82-010083; SAND-81-1842C; CONF-810510-3) Avail: NTIS HC A02/MF A01

Lithium-sulfur dioxide cells used for long life applications at Sandia National Laboratories (SNL) were found to fail prematurely on real time tests. Examination of cells indicated four failure modes are exhibited by these cells; glass corrosion, positive lead corrosion, negative lead corrosion, and stress corrosion cracking of the case bottoms. A program was initiated to solve these problems. This program resulted in the development of a new corrosion resistant glass for use in the glas to metal seals, use of a new noncorrosive positive pin material, a new design for the anode which eliminates corrosion at the anode lead, and the stress relieving of mild steel cans used as battery cases. These modifications have minimized corrosion reactions in lithium sulfur dioxide cells, allowing them to operate for extended periods of time. DOE

N83-29861# Sandia Labs., Albuquerque, N. Mex.
FLOWING-ELECTROLYTE-BATTERY TESTING AND EVALUATION
P. C. Butler, D. W. Miller, and A. E. Verardo 1982 6 p refs Presented at the 17th Intersoc. Energy Conversion Eng. Conf., Los Angeles, 8 Aug. 1982
(Contract DE-AC04-76DP-00789)
(DE82-015258; SAND-82-0381C; CONF-820814-6) Avail: NTIS HC A02/MF A01

A laboratory to evaluate the performance and cycle life of flowing electrolyte battery systems has been established at Sandia National Laboratories. Four unique flow batteries are being tested in the laboratory using a four variable two level factorial experimental plan. Two Exxon zinc bromine batteries and one Gould zinc bromine battery are under test. One NASA Redox battery is on test. This paper describes results obtained to date from the test program. Cycle history, efficiency values, and general performance observations for these batteries are reported. The factorial test program and available statistical results are also discussed. DOE

N83-29862# Exxon Research and Engineering Co., Linden, N.J. Advanced Energy Systems Lab.
PRESENT DEVELOPMENT STATUS OF EXXON'S ZINC-BROMINE BATTERY FOR BULK ENERGY STORAGE
R. Bellows and P. Malachesky 6 May 1982 22 p Presented at the DUG-U BOAT Joint Meeting, Miami, Fla., 6 May 1982
(Contract DE-AC04-76DP-00789)
(DE82-013642; SAND-82-7044C; CONF-820542-1) Avail: NTIS HC A02/MF A01

Portions of document are illegible. Diagrams and slide reproductions of the system are presented; and performance, maintenance, and cost information is outlined. DOE

N83-29863# TRW Energy Systems, Redondo Beach, Calif.
COAL-FIRED MHD COMBUSTION DEVELOPMENT PROJECT: PHASE 3B Quarterly Technical Progress Report, 13 Jan. - 30 Apr. 1982
20 May 1983 30 p
(Contract DE-AC22-81PC-40502)
(DE82-015176; MDH-III-82-072; QTPR-1) Avail: NTIS HC A03/MF A01

The first quarterly technical progress report of the Coal Fired MHD Combustor Development Project (Phase IIIB) presents the accomplishments during the period 13 January to 30 April, 1982. The scope of work covered by this quarterly report relates to those tasks associated with preparing the TRW 20 MW/sub t/ MHD coal combustor for delivery to AERL for integrated power tests and the work associated with the preliminary design of a 50 MW/sub t/ coal-fired combustor. Progress during this reporting period is described. All new 20 MW/sub t/hardware was designed and fabricated. Interface coordination meetings were conducted with AERL and DOE. Interface control drawings were completed and a 20 MW/sub t/coal combustion User's manual was delivered to AERL. The User's manual contained a shipping plan, a crew training plan, an assembly manual, interface documentation and recommended operating procedures. DOE

N83-29864# California Univ., Livermore. Lawrence Livermore Lab.
METAL-AIR BATTERY RESEARCH AND DEVELOPMENT
Ervin Behrin, ed. and John F. Cooper, ed. May 1982 48 p refs
(Contract W-7405-eng-48)
(DE82-019881; UCID-19440) Avail: NTIS HC A03/MF A01

This report summarizes the activities of the Metal-air Battery Program during the calendar year 1981. The principal objective is to develop a refuelable battery as an automotive energy source for general-purpose electric vehicles and to conduct engineering demonstrations of its ability to provide vehicles with the range, acceleration, and rapid refueling capability of current internal-combustion-engine automobiles. The second objective is to develop an electrically-rechargeable battery for specific-mission electric vehicles, such as commuter vehicles, that can provide low-cost transportation. The development progression is to: (1) develop a mechanically rechargeable aluminum-air power cell using model electrodes, (2) develop cost-effective anode and cathode materials and structures as required to achieve reliability and efficiency goals, and to establish the economic competitiveness of this technology, and (3) develop and integrated propulsion system utilizing the power cell. DOE

N83-29865# Avco Systems Div., Wilmington, Mass.
A COMPOSITE-FLYWHEEL BURST-CONTAINMENT STUDY
Alan D. Sapowith and William E. Handy Jan. 1982 120 p refs Prepared for California Univ., Livermore. Lawrence Livermore Lab.
(Contract W-7405-eng-48)
(DE82-014138; UCRL-15452; AVSD-0350-81-RR) Avail: NTIS HC A06/MF A01

A key component impacting total flywheel energy storage system weight is the containment structure. This report addresses the factors that shape this structure and define its design criteria. In addition, containment weight estimates are made for the several composite flywheel designs of interest so that judgements can be made as to the relative weights of their containment structure. The requirements set down for this program were that all containment weight estimates be based on a 1 kWh burst. It should be noted that typical flywheel requirements for regenerative braking of small automobiles call for deliverable energies of 0.25 kWh. This leads to expected maximum burst energies of 0.5 kWh. The flywheels studied are those considered most likely to be carried further for operational design. These are: The pseudo isotropic disk flywheel, sometimes called the alpha ply; the SMC molded disk; either disk with a carbon ring; the subcircular rim with cruciform hub; and Avco's bi-directional circular weave disk. DOE

N83-29866# Sandia Labs., Albuquerque, N. Mex.
PERMANENT DAMAGE EFFECTS IN Si AND AlGaAs/GaAs PHOTODIODES
J. J. Wiczer, L. R. Dawson, G. C. Osbourn, and C. E. Barnes 1982 20 p refs Presented at the IEEE Ann. Conf. on Nucl. and Space Radiation Effect, Las Vegas, Nev., 20 Jul. 1982
(Contract DE-AC04-76DP-00789)
(DE82-018292; SAND-82-0775C; CONF-820708-7) Avail: NTIS HC A02/MF A01

A study of permanent damage effects in photodiodes due to total dose exposures of 108 rad (Si) ionizing-radiation from a 60 Co source is discussed. Specifically, the degradation of optical quantum efficiency and increases in photodiode leakage current in Si PIN tructures are compared with specially designed and fabricated, double heterostructure AlGaAs/GaAs photodiodes. Results indicate some degradation in quantum efficiency (20 to 30%) for both types of devices. Leakage currents were found to increase significantly after 108 rad in the Si PIN structures but only increase slightly in the AlGaAs/GaAs structures. DOE

N83-29867# Mound Lab., Miamisburg, Ohio.
FEASIBILITY OF A FREE-STANDING INSERTABLE HEAT SOURCE
A. C. Munger, J. H. Mohler, and M. D. Kelly 1982 16 p refs
(Contract DE-AC04-76DP-00053)

(DE82-014207; MLM-2936(OP)) Avail: NTIS HC A02/MF A01

The feasibility of a free-standing insertable heat source to replace an existing heat powder charge has been demonstrated. Successful development of this design eliminates the need for three laser weld joints, a high pressure interface and various manufacturing processes in the next assembly. Previous work yielded a component consisting of a stainless steel tube loaded with Fe/KC104 heat powder and a pyrotechnic ignitor. Although this design is adequate for the function, the advantages of an insertable heat source prompted the present development. The initial concept was to load a heat powder into a thin-walled container that could be inserted later. Varying air gaps prevented proper heat transmission. A freestanding thermite compact pressed to the inside contour of the stainless steel tube was then developed. This compact was attached to an ignitor which could then be threaded into the next assembly. Various thermite materials were evaluated. DOE

N83-29868# Heliotronic G.m.b.H., Burghause (West Germany).
SILICON MATERIAL DEVELOPMENT FOR TERRESTRIAL SOLAR CELLS. PHASE OF EXPLORATION Final Report, Dec. 1981
Erhard Sirtl Bonn Bundesministerium fuer Forschung und Technologie Mar. 1983 79 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-027; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 16,50

A material project based on a multicrystalline silicon is reported. It consists of refining the metallurgical grade silicon via hydro and pyrometallurgical processes, preparation of square shaped ingots by (inert) gas protected or open hearth casting methods, and high speed slicing, using a multiple blade slurry saw. Second generation pilot equipment was constructed. Aluminothermic reduction of quartz sand into silicon and the foil casting process were tested. It is concluded that the production of silicon thru the gaseous phase depends upon the marketing of very cheap basic material (SG-Si< 10 dollar/Kg) and that the purification of metallurgical grade silicon by refining is the most promising method. Author (ESA)

N83-29869# Kraftwerk Union A.G. Reaktortechnik, Erlangen (West Germany). Hauptbereich Vertrieb und Kraftwerkstechnik.
INCREASING THE EFFICIENCY OF COAL-FIRED POWER PLANTS BY MEANS OF A TRANSITION TO MAXIMUM STEAM CONDITIONS Final Report, Mar. 1981
Gunter Aurin and Lothar Stadie Bonn Bundesministerium fuer Forschung und Technologie Apr. 1983 208 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-033; ISSN-0340-7608) Avail: NTIS HC A10/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 36,50

The economic effectiveness of coal-fired power plants working under maximum steam conditions and the technical feasibility of large outputs were studied. The design data for components exposed to high thermal and compressive stresses were determined. It was demonstrated that hard-coal-fired power plants with a rating up to 1000 MW and maximum steam conditions of 300 bar/600 C are technically feasible. The weldability, the manufacture of shaped parts and the testability of piping systems constitute the limits of technical feasibility. Application in the base load range provides an economic incentive for the construction of power plants of this kind. But in medium load range hard coal power plants, this advantage is not practical in this operating mode, the start-up times and rates of load change must be given greater consideration, due to the high steam conditions. Author (ESA)

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N83-29870# Air Force Engineering and Services Center, Tyndall AFB, Fla. Engineering and Services Lab.
ENVIRONMENTAL FATE OF HYDRAZINE FUELS IN AQUEOUS AND SOIL ENVIRONMENTS Final Report, May 1979 - May 1981
Barbara A. Braun and Joseph A. Zirrolli Feb. 1983 30 p refs (AF Proj. 1900)
(AD-A125813; AFFSC/ESL-TR-82-45) Avail: NTIS HC A03/MF A01 CSCL 21/4

The fate of chemicals in aqueous environments is determined by diverse processes: chemical degradation, physical phase transfer, and dilution or dispersion. The study focused on the uncatalyzed aqueous decomposition (distilled, sea, and pond water) of hydrazine fuels. Despite their hypergolic nature, these fuels are remarkably stable in uncatalyzed aqueous solutions. Monomethylhydrazine (MMH) and unsymmetrical dimethylhydrazine (UDMH) were found to be extremely stable in distilled water, and had slow half-lives (10-14 days) in ponds and seawaters. As this study minimized biological decomposition and phase transfer losses, the aqueous half-lives of 10-14 days are very conservative figures and represent worst case situations. Author (GRA)

N83-29871# National Academy of Sciences - National Research Council, Washington, D. C. Committee to Evaluate DOE's Arctic Terrestrial Environmental Research Programs.
ARCTIC TERRESTRIAL ENVIRONMENTAL RESEARCH PROGRAMS OF THE OFFICE OF ENERGY RESEARCH, DEPARTMENT OF ENERGY: EVALUATION AND RECOMMENDATIONS
1982 76 p refs
(Contract DE-AC01-80EV-10453)
(DE82-018600; DOE/EV-10453/T2) Avail: NTIS HC A05/MF A01

An evaluation of DOE research and development efforts in Arctic regions includes specific technologies related to surface mining, pipeline construction; road, railroad, and airfield construction; and industry siting and construction of storage facilities for these resources. Most environmental impacts are seen to come from support activities rather than the specific energy technology. The evaluation shows positive contributions from the programs. DOE

N83-29872# Brookhaven National Lab., Upton, N. Y. Environmental Chemistry Div.
STUDIES OF THE GAS- AND AQUEOUS-PHASE COMPOSITION OF STRATIFORM CLOUDS
Peter H. Daum, Stephen E. Schwartz, and Leonard Neuman 29 Nov. 1982 15 p refs Presented at the 4th Intern. Conf. on Precipitation Scavenging, Dry Deposition and Resuspension, Santa Monica, Calif., 29 Nov. - 3 Dec. 1982 Sponsored in part by EPA
(Contract DE-AC02-76CH-00016; EPRI Proj. RP-2023-1)
(DE83-005912; BNL-32368; CONF-821136-13) Avail: NTIS HC A02/MF A01

The chemical composition of the liquid water and interstitial trace gases and aerosols was measured in liquid water stratiform clouds. The cloud water was found to exhibit pH generally between 3 and 4. Cloud-water samples were significantly more acidic than typical clear-air aerosol. It is concluded that acidification, processes in addition to dissolution of ambient aerosols, must be operative to account for cloud-water acidity. Composition of the cloud-water samples was found to be influenced by cloud liquid water content and by the concentrations of trace gases in the interstitial cloud air. Interstitial aerosol components were generally found at concentrations that were low in comparison to those in the cloud water. Composition of the interstitial aerosol was also different than the cloud water, with the relative acidity being much less; many samples were even slightly basic. Interstitial trace gases were found at concentrations consistent with their chemical and physical properties. Concentrations of relatively insoluble gases

such as nitrogen oxides and ozone were comparable to those found under clear-air conditions. DOE

N83-29873# Pacific Northwest Lab., Richland, Wash.
DUAL TRACER MEASUREMENTS OF PLUME DEPLETION
T. W. Horst, J. C. Doran, and P. W. Nickola Oct. 1982 13 p refs Presented at the 4th Intern. Conf. on Precipitation Scavenging, Dry Deposition and Resuspension, Santa Monica, Calif., 29 Nov. - 3 Dec. 1982 Sponsored in part by EPA
(Contract DE-AC06-76RL-01830)
(DE83-005551; PNL-SA-10416; CONF-821136-17) Avail: NTIS HC A02/MF A01

This paper proposes a new method for determining the deposition velocity that requires only near-surface sampling. Three techniques were evaluated for determining the deposition velocity from the depletion of an airborne plume. These are the mass budget, depletion budget, and surface depletion methods. The mass budget is a straight-forward technique but it requires extensive sampling to define the elevated portion of the plume. These elevated samplers must be closely spaced in the crosswind direction to accurately measure the decrease in downwind mass flux that defines the loss as a function of downwind distance. The height to which these measurements must be made can be reduced, particularly for elevated sources, by the use of a second, non-depositing tracer and the depletion budget approach. However the crosswind spacing requirements are unchanged. The surface depletion method is based on less straight-forward, but physically realistic, assumptions and also requires the use of both depositing and non-depositing tracers, but it eliminates entirely the need for elevated sampling. This is a major advantage since dense surface sampling is much easier to implement than elevated sampling. DOE

N83-29874# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.
CLOUDWATER ACIDITY MEASUREMENTS AND FORMATION MECHANISMS: EXPERIMENTAL DESIGN
Stephen E. Schwartz, Peter H. Daum, Mark R. Hjelmfelt, and Leonard Newman 1982 17 p refs Presented at the 4th Intern. Conf. on Precipitation Scavenging, Dry Deposition and Resuspension, Santa Monica, Calif., 29 Nov. - 3 Dec. 1982
(Contract DE-AC02-76CH-00016; EPRI Proj. RP-2023-1)
(DE83-005911; BNL-32367; CONF-821136-14) Avail: NTIS HC A02/MF A01

Processes of cloud incorporation of acidic species were examined with the objective of defining field measurements for ascertaining their importance. Processes examined were incorporation of soluble strong acid in present pre-cloud air, in-cloud reaction of SO2, NO, and NO2, and accumulation of highly soluble acidic species. Information directly bearing on the importance of these processes may be gained from measurement of the concentrations of pertinent species in cloudwater and in interstitial gas and aerosol phases, in conjunction with interpretation in the context of material distributions, chemical equilibria, and reaction kinetics. Stratiform clouds are selected for initial study because of their spatial uniformity, stability, and amenability to dynamical interpretation. DOE

N83-29875# Chicago Univ., Ill.
MOLECULAR BIOLOGY OF ENVIRONMENTAL AROMATIC HYDROCARBONS Progress Report, Mar. 1979 - Mar. 1982
Samuel B. Weiss Jun. 1982 23 p refs
(Contract DE-AC02-80EV-10328)
(DE82-016978; DOE/EV-10328/3) Avail: NTIS HC A02/MF A01

This report summarizes various studies over the past three years directed towards understanding the mechanism of action of certain polycyclic aromatic hydrocarbons (PAH) that are toxic for biological systems. Since the molecular biology of whole organisms and intact cells is extraordinary complex, we have examined the effect of PAH compounds and their derivatives on the replication of bacterial and animal viruses. The idea of using viral systems for studying the biological activity of aromatic hydrocarbons derives from earlier work showing a close correlation between PAH compounds that inhibit bacterial virus replication and those that are carcinogenic. Similar inhibitory responses on the replication of animal viruses by carcinogenic hydrocarbons have also been reported. DOE

N83-29876# Argonne National Lab., Ill. Div. of Environmental Impact Studies.
CALCULATION OF UNSATURATED HYDRAULIC CONDUCTIVITY
A. B. Gureghian, B. R. Stitt, and L. P. Sanathanan Jun. 1982 67 p refs
(Contract W-31-109-eng-38)
(DE82-016325; ANL/EIS-14) Avail: NTIS HC A04/MF A01

In recent years the subject of liquid waste dispersion in the unsaturated zone of an aquifer has received considerable attention as concern has grown for the environmental impact associated with the disposal of low-level radioactive waste generated by uranium mining and milling operations. Problems related to the leaching of radionuclides or other toxic wastes from tailings ponds are currently being identified. The prediction of the extent and impact of groundwater contamination by mathematical modeling requires the analytical description of soil properties at the site of interest. Soil water characteristic curves, i.e., curves relating soil-water content to the soil-water pressure head may be obtained either by laboratory or field methods. These data may then be used to derive a functional relationship between unsaturated hydraulic conductivity and soil water content. In this report, a few models for calculating the unsaturated hydraulic conductivity are reviewed and compared. It appears that the modified Millington and Quirk method remains unsurpassed in simplicity and accuracy. DOE

N83-29877# GCA Corp., Bedford, Mass.
FINALIZATION OF REPORTS ENTITLED UPDATED ACID RAIN INFORMATION BOOK AND SIMPLIFICATION APPROACHES TO PROTECTING PSD CLASS I AREAS
15 Mar. 1983 10 p
(Contract DE-AC01-82EP-12079)
(DE83-008771; DOE/EP-12079/T4) Avail: NTIS HC A02/MF A01

Several draft final reports are submitted. The work consists of revising these draft final reports incorporating the comments received as a result of participation in the Interagency Task Force on acid rain. A schedule of work, the project organization chart, and cost estimates are included. DOE

N83-29878# Los Alamos Scientific Lab., N. Mex.
VEGETATIONAL ANALYSIS OF A CANYON ECOSYSTEM AT LOS ALAMOS
T. S. Foxx and G. D. Tierney Nov. 1982 28 p refs
(Contract W-7405-eng-36)
(DE83-008277; LA-9576-MS) Avail: NTIS HC A03/MF A01

The floristic composition of the area immediately below a peregrine falcon nesting site was determined. The objective was to determine if any plants found within the disturbed area were key food species for either doves or rodents. Mourning doves are frequent prey of the peregrine and rodents attract owls that are occasional predators on the falcons. DOE

N83-29879# Idaho National Engineering Lab., Idaho Falls.
SUMMARY AND RESULTS OF THE COMPREHENSIVE ENVIRONMENTAL MONITORING PROGRAM AT THE INEL'S RAFT RIVER GEOTHERMAL SITE
R. A. Mayes, T. L. Thurow, and L. S. Cahn 1982 12 p refs Presented at the DOE Environ. Protect. Infor. Meeting, Denver, 7 Dec. 1982
(Contract DE-AC07-76ID-01570)
(DE83-005583; EGG-M-29082; CONF-821215-13) Avail: NTIS HC A02/MF A01

The Raft River Geothermal Program was designed to demonstrate that moderate temperature geothermal fluids could be used to generate electricity and provide an alternate energy source for direct-use applications. The environmental program was initiated

soon after drilling began. The major elements of the monitoring program were continued during the construction and experimental testing of the 5-MW(e) power plant. The monitoring studies established pre-development baseline conditions of and assessed changes in the physical, biological, and human environment. The Physical Environmental Monitoring Program collected baseline data on geology, subsidence, seismicity, meteorology and air quality. The Biological Environmental Monitoring Program collected baseline data on the flora and fauna of the terrestrial ecosystem, studied raptor disturbances, and surveyed the aquatic communities of the Raft River. DOE

N83-29880# WED Enterprises, Glendale, Calif.
WATER-HYACINTH PRODUCTION PRIMARY AND ADVANCED TREATMENT OF WASTEWATER Final Report
Benedict R. Schwegler, Jr. Jan. 1983 46 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE83-006033; SERI/STR-231-1886) Avail: NTIS HC A03/MF A01

A prototype water hyacinth wastewater treatment system has been in operation for two years at Walt Disney World, near Orlando, Florida. Typically, the hyacinth system removes 80-90% total suspended solids and B.O.D. from the influent stream. Major impacts on water quality exiting the system are: seasonal variations in solar radiation, air and water temperature; operational problems, particularly harvesting equipment breakdown, and retention time in the ponds. Phosphorus and nitrogen removal show a strong seasonal dependence, with removal rates varying from 0.08 to 1.11 g/sq m day for N and from 0.05 to 0.29 g/sq c/day for P. Nitrogen removal rates show a strong dependence on retention times, with a retention time of 5 days appearing to be a critical limit for the establishment of an active population of denitrifying bacteria. Hyacinth biomass productivity of the system was approximately 66.7 dry metric tons per hectare year (30 dry tons/acre year) during the second year of operation. An Experimental Test Unit (ETU) for anaerobic digestion of hyacinths to methane will be installed by late 1983. DOE

N83-29881# Research Inst. of National Defence, Umea (Sweden). Dept. 4.
MICROBIAL DEGRADATION OF OIL: RESEARCH AND DEVELOPMENT 1982, TOBOS 85 PROGRAM
Roger Roffey and Anders Edlund Jan. 1983 50 p refs In SWEDISH; ENGLISH summary Sponsored by Swedish Board of Technical Development (STU)
(FOA-C-40167-B4) Avail: NTIS HC A03/MF A01

Types and occurrence of oil-degrading microorganisms, effects of oil on the microbial population, mechanisms for degradation and environmental factors effects on biodegradation are treated. The use of microorganisms for oil clean-up, and methods to stimulate the microbial degradation of oil at sea or on oil sludges on land are discussed. The best results are obtained by accelerating natural microbial degradation by adding nitrogen and phosphorus compounds to oil slicks at sea. Author (ESA)

N83-29882# Oklahoma State Dept. of Health, Oklahoma City.
ADVANCED BIOLOGICAL TREATMENT OF MUNICIPAL WASTEWATER THROUGH AQUACULTURE Final Report, 1977 - 1979
Dempsey H. Hall and Joel E. Shelton Jan. 1983 94 p refs
(Contract EPA-R-803703)
(PB83-159319; EPA-600/2-83-007) Avail: NTIS HC A05/MF A01 CSCL 06C

The studies were conducted using two four-celled raceways constructed in series, adjacent to a primary wastewater stabilization pond. One raceway functioned as the experimental system, while the other served as a control condition-1 experimental phase, which used a source of wastewater from the primary wastewater stabilization pond, and (2) condition-2 experimental phase, which used a source of wastewater from the primary clarifier of an activated sludge treatment plant, that also provided the source of wastewater to the primary wastewater stabilization pond. Under both experimental conditions the experimental raceway was stocked with a native Oklahoma fish, Pimephales promelas, at two stocking densities, one for each experimental phase.
Author (GRA)

N83-29883# Louisiana State Univ., Baton Rouge.
MONITORING BIOTRANSFORMATION AND BIODEGRADATION OF XENOBIOTICS IN SIMULATED AQUATIC MICROENVIRONMENTAL SYSTEMS
R. J. Portier and S. P. Meyers 1982 17 p refs
(Grant EPA-R-804976)
(PB83-153718; EPA-600/J-82-261) Avail: NTIS HC A02/MF A01 CSCL 06F

Microbiological studies coupled with physiochemical analysis of environmentally significant xenobiotics were conducted in continuous flowthrough and carbon metabolism microcosms to determine the behavior of these to toxic substances in soil and sediment-water systems typical of coastal wetlands. The organophosphate, 14C-methyl parathion, and the chlorinated insecticide, 14C-kepone, were examined for stress indexes bases on microbial response and compound turnover. Author (GRA)

N83-29884# Municipal Environmental Research Lab., Cincinnati, Ohio. Drinking Water Research Div.
ADEQUACY OF DISINFECTION FOR CONTROL OF NEWLY RECOGNIZED WATERBORNE PATHOGENS
John C. Hoff and Edwin E. Geldreich 1982 16 p refs Presented at the 10th Water Quality Technol. Conf., Nashville, 5-8 Dec. 1982
(PB83-152181; EPA-600/D-83-001) Avail: NTIS HC A02/MF A01 CSCL 06F

Agents recently recognized as causes or potential causes of waterborne outbreaks include pathogenic bacteria (Campylobacter jejuni, Yersinia enterocolitical), viruses (rotavirus, Norwalk virus and other poorly defined viral agents) and Giardia lamblia, a protozoan agent. Although not a cause of waterborne disease in the classical sense, concern also has been expressed about the relationship of water supplies to the occurrence of legionellosis caused by Legionella penumophila. New disinfection information on hepatitis A virus (HAV), long established as a cause of waterborne disease, has recently been developed and is included in this report. With the possible exception of Giardia lamblia, waterborne outbreaks caused by these agents seem to occur mainly as a result of deficiencies in treatment, massive contamination of water sources that received inadequate treatment, or contamination after treatment. GRA

N83-29885# Environmental Protection Agency, Research Triangle Park, N.C. Office of Air Quality Planning and Standards.
VOC (VOLATILE ORGANIC COMPOUND) FUGITIVE EMISSIONS IN PETROLEUM REFINING INDUSTRY: BACKGROUND INFORMATION FOR PROPOSED STANDARDS
Don R. Goodwin Nov. 1982 282 p refs
(PB83-157743; EPA-450/3-81-015A) Avail: NTIS HC A13/MF A01 CSCL 13B

Standards of performance for the control of volatile organic compound (VOC) fugitive emissions from the petroleum refining industry are being proposed under Section 111 of the Clean Air Act. These standards would apply to fugitive emission sources of VOC within new, modified, and reconstructed petroleum refinery compressors and process units. This document contains background information and environmental and economic impact assessments of the regulatory alternatives considered in developing the proposed standards. GRA

N83-29886# Environmental Protection Agency, Research Triangle Park, N.C. Emission Standards and Engineering Div.
GASEOUS CONTINUOUS EMISSION MONITORING SYSTEMS. PERFORMANCE SPECIFICATION GUIDELINES FOR SO2, NOX, CO2, O2 AND TRS
Dec. 1982 32 p refs
(PB83-161646; EPA-450/3-82-026) Avail: NTIS HC A03/MF A01 CSCL 14B

This document serves as a guideline for vendors, purchasers,

and operators of gaseous continuous emission monitoring systems and offers suggestions for equipment performance and specifications, test procedures, and data reduction procedures for evaluating the capabilities of these systems. Author (GRA)

N83-29887# Environmental Measurements, Inc. Arnold, Md.
AIRBORNE FIELD STUDY OF POWER PLANT PLUME DISPERSION IN STABLE ATMOSPHERES Final Report
Gary M. Klauber Jun. 1982 223 p refs
(PB83-168930; PPSP/PPRP-60) Avail: NTIS HC A10/MF A01 CSCL 13B

The results of a study to determine how well the measured parameters for a power plant plume in rolling terrain agree with those used for EPA's point source models are presented. Field measurements were taken to quantify the horizontal and vertical SO2 dispersion parameters of the plume from the Dickerson, Maryland generating station operated by Potomac Electric Power Company, under stable atmospheric conditions. Direct plume impact on Sugarload Mountain was also studied. GRA

N83-29888# Florida State Univ., Gainesville. Dept. of Environmental Engineering Sciences.
ACIDITY, NUTRIENTS AND MINERALS IN ATMOSPHERIC PRECIPITATION OVER FLORIDA: DEPOSITION PATTERNS, MECHANISMS AND ECOLOGICAL EFFECTS Final Report, Sep. 1977 - Dec. 1979
Patrick L. Brezonik, Charles D. Hendry, Jr., Eric S. Edgerton, Randy L. Schulze, and Thomas L. Crisman Feb. 1983 175 p refs
(Grant EPA-R-805560)
(PB83-165837; EPA-600/3-83-004) Avail: NTIS HC A08/MF A01 CSCL 13B

Deposition patterns, mechanisms and ecological effects from atmospheric precipitation were examined. The results are summarized according to the three major phases of the project: (1) atmospheric deposition of nutrients and minerals; (2) the spatial and temporal distribution of rainfall acidity in Florida; and (3) the effects of acidification on chemical and biological conditions in softwater lakes of Florida. Author

N83-29889# Environmental Research Lab., Gulf Breeze, Fla.
A PERSPECTIVE ON THE ROLE OF MICROCOSMS IN ENVIRONMENTAL FATE AND EFFECTS ASSESSMENTS
P. H. Pritchard and A. W. Bourquin 1982 40 p refs Presented at the Conf. on Meaningful Measures of Marine Pollution Effects, Pensacola Beach, Fla., 16-19 Apr. 1982
(PB83-165530; EPA-600/D-83-009; Contrib-468) Avail: NTIS HC A03/MF A01 CSCL 06F

This paper provides a perspective on the possible interfacing of microcosm studies with both waste assimilatory capacity determinations and other less quantitative types of assessment. Some of the problems and inconsistencies in the interpretation and application of microcosm results are discussed. Conceptual ideas on how microcosms can be used in quantitative and qualitative risk analysis are presented. The microcosm is also a research tool which can enhance our quantitative understanding of the process interactions and metabolic networks typical of natural ecosystems. GRA

N83-29890# Earth Satellite Corp., Washington, D. C.
MISSISSIPPI DELTAIC PLAIN REGION ECOLOGICAL CHARACTERIZATION: AN ECOLOGICAL ATLAS. MAP NARRATIVES
Donald Garofalo Oct. 1982 107 p refs Prepared in cooperation with Burk and Associates, Inc.
(Contract DI-14-16-0009-79-120)
(PB83-157669; FWS/OBS-81/16) Avail: NTIS HC A06/MF A01 CSCL 06F

The Mississippi Deltaic Plain Region is the coastal area from Vermilion Bay, LA, to the Mississippi-Alabama line. A descriptive explanation of data presented in this report and on separate maps is provided for socioeconomic features; oil and gas infrastructure and mineral resources: soils, geologic/geomorphic features and manmade lands; climatology and hydrology; active coastal processes and biological resources. GRA

N83-30032*# Texas A&M Univ., College Station. Dept. of Plant Sciences.
AIR POLLUTANT PRODUCTION BY ALGAL CELL CULTURES
F. Fong and E. A. Funkhouser *In* NASA. Ames Research Center Controlled Ecol. Life Support System Dec. 1982 p 57-59 refs
(For primary document see N83-30016 18-54)
Avail: NTIS HC A05/MF A01 CSCL 13B

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation.*

N83-29891 Kansas Univ., Lawrence.
SOLAR AND INTERPLANETARY IONS NEAR EARTH Ph.D. Thesis
Patrick Ray Briggs 1981 215 p
Avail: Univ. Microfilms Order No. DA8218741

Using an array of satellite and ground-based monitoring data in conjunction with CPME data, we have identified particle-producing flares occurring between September 1972 and June 1978. Event-averaged spectra and abundance ratios are studied for statistical trends. Among the results: (1) The average proton spectrum tends to be harder for flares with larger total proton output. Alphas and medium nuclei do not show this trend. (2) Crossplots of even proton flux vs. alpha flux at equal energy per nucleon demonstrate that, while the main trend shows a slight increase of P/alpha with event size, there is a distinct group of flares which have unusually large P/alpha ratios. Examination of individual events shows that most are associated with the second in a series of closely spaced particle flares. This finding suggests that the region near the flare site itself may be the origin of this compositional anomaly. (3) Crossplots of medium nuclei vs. proton flux emphasize the isolated class of Z-rich flares: particle flares with high medium nuclei content. Dissert. Abstr.

N83-29892 Florida State Univ., Tallahassee.
MECHANISMS OF STRATOSPHERIC OZONE TRANSPORT Ph.D. Thesis
Richard Benton Rood 1982 224 p
Avail: Univ. Microfilms Order No. DA8229156

Two beta-planetary wave models are used to study ozone transport in the stratosphere. In the first model, ozone transport is calculated for steady, dissipative planetary waves using the Eulerian, Lagrangian-mean, and residual circulations. A Lagrangian model of parcel dynamics is used to interpret planetary wave-photochemistry interaction. In chemically active regions the mean field ozone changes are found to be significant only where there are large gradients in chemical sources and sinks along particle trajectories. The largest changes in the mean field are found in the lower stratosphere and are due to the Lagrangian-mean advection. In the second model, ozone transport is calculated for the combined diabatic and time dependent planetary wave circulations. Both circulations are instrumental in the formation of the polar spring ozone maximum. The diabatic circulation transports ozone into the lower stratosphere, and planetary waves transport large amounts of ozone northward during sudden and final warmings. Using the transport mechanisms revealed in these models, a scenario is deduced to explain observed large scale ozone transport phenomena. Dissert. Abstr.

N83-29893*# California Inst. of Tech., Pasadena. Seismological Lab.
A SIMPLE DERIVATION OF THE FORMULA TO CALCULATED SYNTHETIC LONG-PERIOD SEISMOGRAMS IN A HETEROGENEOUS EARTH BY NORMAL MODE SUMMATION
Toshiro Tanimoto [1983] 6 p refs
(Grant NsG-7610)
(NASA-CR-172818; NAS 1.26:172818; Contrib-3909) Avail: NTIS

HC A02/MF A01 CSCL 08K

A simple modification of Gilbert's formula to account for slight lateral heterogeneity of the Earth leads to a convenient formula to calculate synthetic long period seismograms. Partial derivatives are easily calculated, thus the formula is suitable for direct inversion of seismograms for lateral heterogeneity of the Earth. Author

N83-29894*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
REPORTS ON CRUSTAL MOVEMENTS AND DEFORMATIONS
Steven C. Cohen and Tim Peck May 1983 170 p
(NASA-TM-85041; NAS 1.15:85041) Avail: NTIS HC A08/MF A01 CSCL 08G

This Catalog of Reports on Crustal Movements and Deformation is a structured bibliography of scientific papers on the movements of the Earth crust. The catalog summarizes by various subjects papers containing data on the movement of the Earth's surface due to tectonic processes. In preparing the catalog we have included studies of tectonic plate motions, spreading and convergence, microplate rotation, regional crustal deformation strain accumulation and deformations associated with the earthquake cycle, and fault motion. We have also included several papers dealing with models of tectonic plate motion and with crustal stress. Papers which discuss tectonic and geologic history but which do not present rates of movements or deformations and papers which are primarily theoretical analyses have been excluded from the catalog. An index of authors cross-referenced to their publications also appears in the catalog. The catalog covers articles appearing in reviewed technical journals during the years 1970-1981. Although there are citations from about twenty journals most of the items come from the following publications: Journal of Geophysical Research, Tectonophysics, Geological Society of America Bulletin of the Seismological Society of America, Nature, Science, Geophysical Journal of the Royal Astronomical Society, Earth and Planetary Science Letters, and Geology. Author

N83-29895# Systems Science and Software, La Jolla, Calif.
ADVANCED SEISMOLOGICAL RESEARCH AND IMPROVED YIELD DETERMINATION Final Report, 1 Oct. 1980 - 1 Oct. 1981
J. Theodore Cherry May 1982 14 p
(Contract F08606-79-C-0008; ARPA Order 2551)
(AD-A126001; SSS-R-82-5571; VSC-TR-82-28) Avail: NTIS HC A02/MF A01 CSCL 08/11

The objective of the S-CUBED research program is to extend our present understanding of the generation, propagation, detection and analysis of seismic waves by both underground explosions and earthquake sources. The goal is to improve the United States' ability to monitor compliance with treaties limiting the yields of underground nuclear explosions. Specific topics summarized in the following sections are: The identification of the critical explosion/earthquake source and geologic parameters effecting detection, discrimination and yield estimation; The evaluation of suites of events in terms of our ability to predict the observed body waves and surface waves from these events which travel over previously uncalibrated paths; and The support of remote seismic research involving the development and acquisition of remote hardware necessary to optimize utilization of the computer system at the Seismic Research Center. GRA

N83-29896# Systems Science and Software, La Jolla, Calif.
SEISMOLOGICAL DISCRIMINATION AND YIELD DETERMINATION RESEARCH Final Report, 17 Nov. 1978 - 30 Sep. 1979
Thomas C. Bache, J. Theodore Cherry, P. J. Coleman, S. M. Day, and J. R. Murphy Alexandria, Va. VELA Seismological Center Feb. 1980 135 p refs
(Contract F08606-79-C-0008; ARPA Order 2551)
(AD-A126002; SSS-R-80-4383; VSC-TR-80-3) Avail: NTIS HC A07/MF A01 CSCL 08/11

This report summarizes research activities during Fiscal Year 1979 which were directed toward the development of improved methods for discriminating between the seismic signals from earthquakes and explosions and the development of improved methods for estimating explosion yield. Empirical, theoretical and experimental studies were completed in seven topic areas: Source Calculations, Discrimination, Body Wave Magnitude and Yield Determination, Small-Scale Experiments, Data Processing Analysis, Ground Motion Analysis, and Selected Geological Studies. The major projects in each of these topic areas are summarized. Also presented is an Appendix listing the abstracts of all reports submitted to the Vela Seismological Center since May 1975. Author (GRA)

N83-29897# Bedford Research Associates, Mass.
INVESTIGATE AND DEVELOP MATHEMATICAL FORMULAS IN SUPPORT OF ATMOSPHERIC STUDIES Final Report, Aug. 1979 - Sep. 1982
J. Noonan, D. Dechichio, K. Scharr, N. Scotti, S. Chua, P. Mechan, and H. Wadzinski Hanscom AFB, Mass. AFGL 15 Jan. 1983 73 p refs
(Contract F19628-79-C-0163; AF Proj. 9993)
(AD-A125869; AFGL-TR-83-0003) Avail: NTIS HC A04/MF A01 CSCL 04/1

This report presents a summary of analyses and mathematical modelling done in support of some AFGL atmospheric research projects. In particular, work on the problems of atmospheric turbulence, magnetometer network, DMSP Ion density modelling, and Low Energy Electron and Photon cross section studies are discussed. Author (GRA)

N83-29898# Royal Norwegian Council for Scientific and Industrial Research, Kjeller.
THE NORWEGIAN SEISMIC ARRAY (NORSAR) Semiannual Technical Summary Report, 1 Oct. 1981 - 31 Mar. 1982
Joergen Torstveit, ed. Jul. 1982 79 p refs
(Contract F08606-79-C-0001; ARPA Order 2551)
(AD-A126249; NORSAR-SR-2-81/82; NORSAR-CONTRIB-323) Avail: NTIS HC A05/MF A01 CSCL 08/11

The uptime of the NORSAR online detection processor system has averaged 91.9%, which represents an improvement of 3% compared to the previous period. Almost half of the downtime was due to problems in connection with the termination of the NOrSAR ARPANET circuit. The SPS has been working well and has caused less than 1% downtime. A total of 1681 events were reported in this period, giving a daily average of 9.2 events. The number of reported events per month varies from 210 in February to 363 in December. There have been no major breakdowns on the communications lines, but some lines have had periods with bad performance, especially the 02C line. The new DP system to be implemented on IBM 4331/MODCOMP is now, except for some EOC functions, ready. The communication problem between IBM 4331 and MODCOMP has been solved, and test runs have been done with no errors. Some improvements in programs and some more testing still needs to be done before the new DP is ready to replace the current system. The research activity is briefly described with a summary of seven technical reports/papers prepared. GRA

N83-29899# Michigan Technological Univ., Houghton. Research Center.
PROPAGATION OF VISIBLE AND INFRARED RADIATION IN FOG, RAIN, AND SNOW Final Report, 9 Apr. 1981 - 1 Apr. 1982
L. W. Winchester, Jr. and G. G. Gimmestad Warren, Mich. Army Tank-Automotive Command Jul. 1982 103 p refs
(Grant DAAE07-81-G-4006)
(AD-A126062; TACOM-TR-12685; KRC-82-10) Avail: NTIS HC A06/MF A01 CSCL 04/1

Measurements of the attenuation of radiation at 0.6328, 1.06, and 8 to 12 micrometers by fog, rain, and snow are reported. Theoretical models are presented which account for the scattering properties of fog droplets, raindrops, and snow crystals at each wavelength. Attenuation by fog in the 8 to 12 micrometer band is shown to be a function of the liquid water content of the fog while attenuation at 0.6328 micrometers is a function of both liquid water content and the fog droplet size distribution. It is shown

that not only must the scattering properties of rain drops and snow crystals be properly modeled, but the susceptibility of the experimental instruments to scattered radiation must also be known. Author (GRA)

N83-29900# Lockheed Missiles and Space Co., Palo Alto, Calif.
COORDINATED GROUND-BASED MEASUREMENTS AT CHATANIKA: AURORAL SPATIAL AND TEMPORAL STRUCTURES Final Report, 1 Jan. 1979 - 21 Dec. 1981
R. D. Sears 21 Dec. 1981 92 p refs
(Contract DNA001-77-C-0329)
(AD-A126113; AD-E302080; DNA-6103F) Avail: NTIS HC A05/MF A01 CSCL 04/1

Spectrophotometric measurements of the auroral emission intensities in several wavelength regions were made at Chatanika, Alaska during observing periods in 1978 through 1980. Specific experiments reported herein include: measurements of the temporal and spatial power spectral densities and associated statistical quantities for auroral emission irregularities which occurred during the development, intensification, and decay of a poleward expansion; characterization of the precipitating electron flux, total energy deposit and mean energy parameter, and the response of the ionosphere during an intense pulsating aurora, and observation of the precipitating electron flux characteristics and the ionospheric response over a period of decaying precipitation intensity located at the poleward edge of the aurora oval. Both of the latter measurements were conducted as coordinated experiments with the Chatanika incoherent scatter radar. GRA

N83-29901# Beers Associates, Inc., Reston, Va.
UV EMISSIONS AND THE ELECTRON DENSITY IN THE AURORAL AND LOW TO MID-LATITUDE DAYTIME IONOSPHERES Final Report, May 1981 - Sep. 1982
D. J. Strickland and R. E. Daniell Hanscom AFB, Mass. AFGL Nov. 1982 145 p refs
(Contract F19628-81-C-0066; AF Proj. 4643)
(AD-A126318; AFGL-TR-82-0373) Avail: NTIS HC A07/MF A01 CSCL 04/1

A number of problems have been addressed in this work. They have been accompanied by extensive code development which has led to new capabilities such as the modeling of O+ diffusion and to some significant reductions in code running times and disk allocation requirements. The given problems, either directly or indirectly, have dealt with the issue of using satellite optical systems to monitor ionospheric conditions. The central question of interest is 'How accurately can the E and F region electron density profiles (n(e)) be determined from satellite optical data on a global scale'. We have addressed this question as it pertains to the auroral E region and low to mid-latitude daytime E and F regions. Most of the reported work is on the first of these regions. The approach has been from first principles in which we start with either an incident auroral electron spectrum or a solar EUV/X-ray spectrum and proceed to determine the associated electron distribution function followed by its associated excitation and ionization rates, optical intensities, and electron and ion densities. GRA

N83-29902# Ohio State Univ., Columbus. Dept. of Geodetic Science and Surveying.
THEORIES OF NUTATION AND POLAR MOTION III
Helmut Moritz (Technical Univ. at Graz) Hanscom AFB, Mass. AFGL Dec. 1982 123 p refs
(Contract F19628-82-K-0017; AF Proj. 7600)
(AD-A126289; AFGL-TR-82-0387; REPT-342; SR-2) Avail: NTIS HC A06/MF A01 CSCL 08/11

The present report is a continuation and conclusion of two previous OSU-DGSS reports (AD-A108 999 and AD-A099 015). It treats the solution of Sasao, Okubo and Saito (1980), which is the simplest and most straight forward solution of Molodensky's liquid core problem (Part A). In Part B, a relatively little known variational principle of Poincare is derived and applied to a unified deduction of the equations of Sasao, et al. Part C provides explicit expression for lunisolar nutation and polar motion for the principal terrestrial axes: the rotation axis, the figure axis, the mean Tisserand axis, the angular momentum axis, and the axis associated with the Celestial Ephemeris Pole as adopted by the IAU in 1979, taking into account liquid core effects. GRA

N83-29903# Systems Science and Software, La Jolla, Calif.
ADVANCED SEISMOLOGICAL RESEARCH AND IMPROVED YIELD DETERMINATION Final Report, 1 Oct. 1981 - 1 Oct. 1982
J. Theodore Cherry Alexandria, Va. VELA Seismological Center Nov. 1982 9 p
(Contract F08606-79-C-0008; ARPA Order 2551)
(AD-A125508; VSC-TR-83-2; SSS-R-83-5868) Avail: NTIS HC A02/MF A01 CSCL 08/11

This report summarizes the work performed by S-CUBED involving the prediction of seismic coupling in salt, the analysis of tectonic release from underground explosions, the verification of constitutive models used to calculate ground motion in partially saturated brittle rocks, and the determination of the physical basis of two discrimination techniques. Author (GRA)

N83-29904# Science Applications, Inc., McLean, Va.
GEOPHYSICAL PLASMAS AND ATMOSPHERIC MODELING Final Report
Ellis Hyman, Pradeep Chaturvedi, James Chen, Jim Drake, Gurudas Ganguli, Y. C. Lee, Richard Lindzen, John Lyon, Horace Mitchell, Dennis Papadopoulos et al Feb. 1983 670 p refs
(Contract N00014-81-C-2038; SAI Proj. 1-157-13-705-00)
(AD-A126341; SAI-83-144-WA) Avail: NTIS HC A99/MF A01 CSCL 04/1

In the following subsections we will describe the major accomplishments in each of the following research efforts: (1) magnetospheric computer simulation, (2) non-linear saturation and transport via the lower hybrid drift instability, (3) the current driven ion cyclotron instability, (4) tearing-mode stability properties of an anisotropic plasma layer, (5) analyses of high latitude irregularity phenomena, (6) auroral plasma transport, (7) the EXB instability, (8) the morphology of a multi-bubble system in the ionosphere, (9) double layer simulations, (10) anomalous resistivity of auroral electrons, (11) energy exchange in the Io plasma torus, (12) uranium cloud modeling, (13) NRL Laser/HANE experiment support, (14) fractal theory applied to striating ionospheric plasma clouds, (15) ELF/VLF wave generation, (16) ozone transport in the lower atmosphere and, (17) stratospheric dynamics. GRA

N83-29905# Massachusetts Inst. of Tech., Cambridge. Dept. of Chemistry.
SPECTROSCOPIC PROPERTIES OF METAL MONOXIDES AND HYDROXIDES IMPORTANT IN THE IONOSPHERE Final Report, 1 Jul. 1979 - 1 Dec. 1982
Robert W. Field Hanscom AFB, Mass. AFGL 1 Jan. 1983 17 p refs
(Contract F19628-79-C-0123; AF Proj. 2310)
(AD-A126332; AFGL-TR-83-0021) Avail: NTIS HC A02/MF A01 CSCL 04/1

Excited state systems of Mg0 have been examined by CW and pulsed dye laser fluorescence excitation spectroscopy. The B-a (0,0) and (0,1) and B-A (1,1), (2,2), and (2,1) bands have been analyzed deperturbed, and reduced to molecular constants. The deperturbation model quantitatively accounts for the oscillator strength in one nominally forbidden system through intensity borrowing from other systems. The most important use of the Mg0 B-a system will be proof, via OODR experiments now in progress, that the lambda <320nm continuum arises from Mg0 transition, thereby providing direct optical spectroscopic bounds to the dissociation energy of the Mg0 molecules. Four papers are in preparation describing the results of this research program. GRA

N83-29906# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Geotechnical Lab.
CAVITY DETECTION AND DELINEATION RESEARCH. PART 4:

MICROGRAVIMETRIC SURVEY: MANATEE SPRINGS SITE, FLORIDA Technical Progress Report, May 1980 - Jan. 1981
Dwain K. Butler, Charlie B. Whitten, and Fred L. Smith Mar. 1983 64 p refs
(DA Proj. 4A1-61102-AT-22)
(AD-A125900; WES/TR/GL-83-1-4) Avail: NTIS HC A04/MF A01 CSCL 08/5

Results of a microgravimetric survey at Manatee Springs, Levy County, Fla., are presented. The survey area was 100 by 400 ft, with 20-ft gravity station spacing, and with the long dimension of the area approximately perpendicular to the known trend of the main cavity. The main cavity is about 80 to 100 ft below the surface and has a cross section about 16 to 20 ft in height and 30 to 40 ft in width beneath the survey area. Using a density contrast of -1.3 g/cucm, the gravity anomaly is calculated to be -35 micro Gal with a width at half maximum of 205 ft. The microgravimetric survey results clearly indicate a broad negative anomaly coincident with the location and trend of the cavity system across the survey area. The anomaly magnitude and width are consistent with those calculated from the known depth and dimensions of the main cavity. In addition, a small, closed negative anomaly feature, superimposed on the broad negative feature due to the main cavity, satisfactorily delineated a small secondary cavity feature which was discovered and mapped by cave divers. GRA

N83-29907# California Univ., Berkeley. Lawrence Berkeley Lab. Earth Science Div.
CORRELATION BETWEEN PRECISION GRAVITY AND SUBSIDENCE MEASUREMENTS AT CERRO PRIETO
R. Zelwer and R. B. Grannell (California State Univ.) Oct. 1982 9 p refs Presented at the 4th Symp. on the Cerro Prieto Geothermal Field, Guadalajara, Mexico, 10-12 Aug. 1982 Sponsored in part by the Comision Federal de Electricidad
(Contract DE-AC03-76SF-00098)
(DE83-005870; LBL-14894; CONF-8208109-2; CP-22; EDB-150600) Avail: NTIS HC A02/MF A01

Precision gravity measurements were made in the region of the Cerro Prieto geothermal field at yearly intervals from 1977 to 1981 to assess the feasibility of using gravity to determine subsurface reservoir changes with time. The extent of mass recharge in response to the continued production of fluids from this field was studied. Changes in gravity and ground elevation were observed throughout the region for the period of observation. Results indicate that the largest changes observed were the result of the Magnitude 6.1 (Caltech) Victoria earthquake of 8 June 1980. The epicenter of this earthquake was located 25 km southeast of the field on the Cerro Prieto Fault, which bounds the field on the southwest. Subsidence of up to 55 cm was measured east of the power plant, in the region between the northern end of the Cerro Prieto Fault and the southern end of the Imperial Fault. This area has been postulated to be the site of an active spreading center or pull-apart basin, and has been characterized by a high level of seismic activity during the last 10 years. DOE

N83-29908# Sandia Labs., Albuquerque, N. Mex. Geothermal Research Div.
MAGMA SOURCE LOCATION SURVEY
Harry C. Hardee, James C. Dunn, and John L. Colp Mar. 1982 62 p
(Contract DE-AC04-76DP-00789)
(DE82-019816; SAND-82-0219) Avail: NTIS HC A04/MF A01

A survey of Industry/University geophysicists was conducted to obtain their opinions on the existence of shallow (less than 10 km from surface) magma bodies in the western conterminous United States and methods for locating and defining them. Inputs from 35 individuals were received and are included. Responses were that shallow magma bodies exist and that existing geophysical sensing systems are adequate to locate them. DOE

N83-29909# Geological Survey, Denver, Colo.
REMOTE-REFERENCE MAGNETOTELLURIC SURVEY, NEVADA TEST SITE AND VICINITY, NEVADA AND CALIFORNIA
Robert B. Furgerson and D. B. Hoover 1982 142 p refs Prepared in cooperation with Argonaut Enterprises, Denver, Colo.
(Contract DE-AI08-78ET-44802)
(DE82-019412; USGS-OFR-82-465) Avail: NTIS HC A07/MF A01

A 50-station seismic network has been established in the NTS area. Fifteen remote reference magnetotelluric soundings were made close to these stations. The SE or SES electrical strike directions at the stations agree well (except for three stations) with the major structural trends in the area of the Furnace Creek Fault Zone, the Walker Lane Mobile Belt, the Las Vegas Shear Zone, and the Arrowhead Mine Fault. An attempt was made to establish a cross section. DOE

N83-29910# California Univ., Livermore. Lawrence Livermore Lab.
CROSS-BOREHOLE FRACTURE MAPPING USING ELECTROMAGNETIC GEOTOMOGRAPHY
A. L. Ramirez, F. J. Deadrick, and R. J. Lytle 20 Apr. 1982 10 p refs Presented at the 23d US Symp. on Rock Mech., Berkeley, Calif., 25-27 Aug. 1982
(Contract W-7405-eng-48)
(DE82-012699; UCRL-87536; CONF-820803-2) Avail: NTIS HC A02/MF A01

This article describes the evaluation of a new geophysical technique used to map fractures between boreholes: electromagnetic geotomography used in conjunction with salt water tracers. An experiment has been performed in a granitic rock mass. Geotomographic images have been generated and compared with borehole geophysical data; neutron logs, acoustic velocity logs, caliper logs and acoustic televiewer records. Comparisons between the images and the geophysical logs indicate that clusters of fractures were detected but single fractures were not. DOE

N83-29911# California Univ., Livermore. Lawrence Livermore Lab. Dept. of Earth Sciences.
STEP CRACKS: THEORY, EXPERIMENT, AND FIELD OBSERVATION
Richard K. Thorpe, Merle E. Hanson, Gordon D. Anderson, and Ronald J. Shaffer Apr. 1982 8 p refs Presented at the 23d US Symp. on Rock Mech., Berkeley, Calif., 25-27 Aug. 1982
(Contract W-7405-eng-48)
(DE82-014558; UCRL-87225; CONF-820803-10) Avail: NTIS HC A02/MF A01

The propagation of pressurized fractures across a frictional interface is discussed, with emphasis on the case where an offset, or step, in the crack is produced. Theoretically, the steps can occur at regions of reduced shear strength along the interface. As a fracture is propagated toward a weak zone, extensional strain is concentrated at the edges of the zone where higher shear stresses can be sustained. Thus, when the fracture intersects the weak zone, it can be reinitiated at some small distance away on the opposite wall of the interface. The phenomenon has been studied through numerical modeling and laboratory experiments of the hydraulic fracturing process. Field observation of natural step cracks indicates that the mechanism is applicable to the genesis of joining patterns in rock. Such features should not be confused, therefore, with steps caused by shear displacement of an interface. DOE

N83-29912# California Univ., Livermore. Lawrence Livermore Lab.
MECHANICAL, THERMAL, AND FLUID TRANSPORT PROPERTIES OF ROCK AT DEPTH
H. C. Heard 7 May 1982 13 p refs Presented at the 23d US Symp. on Rock Mech., Berkeley, Calif., 25-27 Aug. 1982
(Contract W-7405-eng-48)
(DE82-016008; UCRL-87582; CONF-820803-9) Avail: NTIS HC A02/MF A01

Laboratory test data can be vital to understanding rock behavior under some set of mechanical-thermal-hydrologic-chemical conditions but in themselves cannot be directly substituted for field results. The purpose of this contribution is threefold: (1) to

briefly identify those laboratory measurements which have been conducted in the past which are of use to predictive modeling of underground rock behavior; (2) to point out those types of laboratory tests which are desirable and are technologically feasible; and (3) to make recommendations for future research in coupled thermal, mechanical, and hydrologic laboratory testing. DOE

N83-29913# Idaho National Engineering Lab., Idaho Falls. Geosciences Branch.
DISPERSION IN FRACTURE NETWORKS
Lawrence C. Hull and Karen N. Koslow 1982 4 p refs Presented at the 8th Geothermal Reservoir Eng. Workshop, Stanford, Calif., 14 Dec. 1982
(Contract DE-AC07-76ID-01570)
(DE83-005584; EGG-M-28182; CONF-821214-4) Avail: NTIS HC A02/MF A01

A physical model was built to study the relationship between fracture network characteristics and dispersion of solutes. The study was aimed at evaluating dispersion effects due to differences in the orientation of flow to the fracture network. Radial flow injection tests were conducted at three different flow rates (30, 60, 90 cu cm min.). Solute breakthrough was measured with specific conductance probes at 14 orientations to the major axis of the fracture networks. Dispersivity coefficients were calculated from breakthrough curves. Results indicated calculated dispersivity coefficients increased with increasing flow rates and were affected by flow orientation to the orthogonal fracture networks. DOE

N83-29914# Bendix Field Engineering Corp., Grand Junction, Colo.
APPLICATION OF NURE DATA TO THE STUDY OF CRYSTALLINE ROCKS IN THE WYOMING URANIUM PROVINCE
S. Marshall Rush, J. R. Anderson, and J. E. Bennett Mar. 1983 138 p refs
(Contract DE-AC13-76GJ-01664)
(DE83-008323; GJBX-14(83)) Avail: NTIS HC A07/MF A01

The Wyoming uranium province study is a part of the National Uranium Resource Evaluation (NURE) program conducted by Bendix Field Engineering Corporation for the US Department of Energy. The ultimate objective of the entire project is the integration of NURE and other data sources to develop a model for a uranium province centered in Wyoming. This paper presents results of the first phase of the Wyoming uranium province study, which comprises characterization of the crystalline rocks of the study area using NURE hydrogeochemical and stream-sediment data, aerial radiometric and magnetic data, and new data generated for zircons from intrusive rocks in the study area. The results of this study indicate that the stream-sediment, aerial radiometric, aerial magnetic, and zircon data are useful in characterization of the crystalline rocks of the uranium province. Author

N83-29915# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Abt. Raumflugdynamik.
ANALYTICAL NONSINGULAR THEORY FOR GEOPOTENTIAL PERTURBATIONS INCLUDING RESONANCE EFFECTS
Wilson Custodio CanesindaSilva Sep. 1982 55 p refs In ENGLISH; GERMAN summary Sponsored by the Federal Republic of Germany and the Federal Republic of Brazil
(DFVLR-FB-82-28) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 19,80

An analytical nonsingular theory to calculate perturbations due to the Earth gravitational field is developed in terms of nonsingular variables. Recurrence relations to calculate the new functions of nonsingular variables are derived and a way to evaluate analytically the resonance effects even in case of deep resonance is proposed. The treatment of resonance by numerical integration is discussed. Author (ESA)

N83-29916# Technische Hogeschool, Delft (Netherlands). Dept. of Electrical Engineering.
VIBROSEISMIC EXCITATION OF ELASTIC WAVES IN A SEMI-INFINITE SOLID
C. vanOnselen Aug. 1982 138 p refs
(PB83-165365; Rept-1982-10) Avail: NTIS HC A07/MF A01 CSCL 08K

The elastodynamic field generated by a harmonically vibrating rigid rectangular base-plate on the traction-free surface of a semi-infinite homogeneous isotropic solid, is investigated. We assume a uniform particle displacement underneath the base plate. Hence, the fundamental unknown quantity is the normal component of the traction. The horizontal component of the traction is assumed to be zero, i.e., the contact between the base plate and the surface of the solid, is assumed to be frictionless. The vertical component of the traction follows by solving the integral equation for the latter quantity. In this inegral equation, the half space Green's function occurs as kernel function. Special attention is given to the integral representation of the latter function. Author (GRA)

N83-29917# Sveriges Geologiska Undersoekning, Uppsala.
ROEDE FORMATION: EARLY OLD RED SANDSTONE FACIES IN THE SILURIAN OF JAEMTLAND SWEDEN
Michael G. Bassett, Lesley Cherns, and Lars Karis 1982 27 p refs
(PB83-165621; SGU-C-793; ISBN-91-7158-262-2; ISSN-0082-0024) Avail: NTIS HC A03/MF A01 CSCL 08G

The youngest Palaeozoic rocks preserved in the Swedish Caledonian mountain belt occur to the north of Alsensjon in Jamtland County. Defined here as the Rode Formation, these beds comprise fluvial sediments deposited in a meandering stream environment. A Wenlock age is also deduced for the Rode Formation. The recognition for the first time of continental facies in the Silurian of Jamtland supports previous interpretations based on wider structural/stratigraphical evidence of a climactic phase of orogenic uplift in the Caledonides as early as Wenlock times. Author (GRA)

N83-29918# Swedish Detonic Research Foundation, Stockholm.
SIMPLE STRENGTH TESTS ON AND HYDRAULIC FRACTURING OF ROCK MATERIAL
Gunnar Wijk 1982 31 p refs
(PB83-165514; DS-1982:10) Avail: NTIS HC A03/MF A01 CSCL 08G

Uniaxial compression, double shear and point load tess were carried out with three rocks and used to estimate the Mohr failure envelopes. The results hve been used to predict the hydraulic fracturing pressure for a borehole in Bohus granite. Experimentally it was found that the real pressure was at least 4 times larger than the predicted value. It is concluded that application of Mohr failure envelope data, which often are derived for homogeneous states of stress, must be used with great care when the loading situation involves non-negligible stress gradients. Author (GRA)

N83-29919# Swedish Detonic Research Foundation, Stockholm.
ANALYSIS OF THE INTERNAL POINT LOAD TEST
Gunnar Wijk 1982 34 p refs
(PB83-164566; DS-1982:12) Avail: NTIS HC A03/MF A01 CSCL 08G

If two distributed point loads act in opposite directions along a diameter in a bore hole in rock material a tensile fracture is expected to be initiated along the plane normal to the loaded diameter. A theoretical analysis of this situation is presented. A practical use of this test would be to measure the rock strength along a bore hole in the field in order to correlate the local strength with observed variations in drilling rate. Author (GRA)

N83-29920# Technische Hogeschool, Delft (Netherlands). Dept. of Geodesy.
PLATE TECTONIC BEHAVIOUR IN THE EAST MEDITERRANEAN REGION TO BE DETECTED BY BASELINE VARIATIONS FROM SATELLITE LASER RANGING
B. H. W. vanGelder and L. Aardoom Mar. 1982 34 p refs
(PB83-159772) Avail: NTIS HC A03/MF A01 CSCL 08G

Various satellite laser ranging network configurations proposed for monitoring crustal motions in the Eastern Mediterranean are confronted with current geophysical hypotheses concerning these motions. A first order network design as an input to the development

of a dedicated measurement strategy, which takes into account constraints such as imposed by the availability of equipment are discussed. GRA

N83-29921# International Geophysical Year World Data Center A, Boulder, Colo.
INTERNATIONAL CATALOG OF GEOMAGNETIC DATA
J. H. Allen, C. C. Abston, V. O. Papitashvili, E. P. Kharin, and N. E. Papitashvili Nov. 1982 203 p Prepared in cooperation with International Geophysical Year World Data Center B
(PB83-161679; UAG-86) Avail: NTIS HC A10/MF A01 CSCL 04A

An international exchange of geophysical observations was established. All the geomagnetic data collected is made available in this catalog. The following areas addressed are geomagnetic data and products available from the World Data Center (WDC) map of magnetic observatories having data in the WDC, high resolution geomagnetic digital data, geomagnetic indices, list of observatories, codes, and coordinates. GRA

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N83-29922# Federal Aviation Administration, Atlantic City, N.J. Aircraft and Airport Systems Technology Div.
A NEW CHARACTERIZATION OF SUPERCOOLED CLOUDS BELOW 10,000 FEET AGL (ABOVE GROUND LEVEL) Final Report
Charles O. Masters Jun. 1983 50 p refs
(FAA Proj. 182-340-200)
(FAA-CT-83-22) Avail: NTIS HC A03/MF A01

Icing envelopes which effectively characterize supercooled clouds from ground level to 10,000 feet above ground level over the conterminous United States were generated from a new data base of aerial observations. It is intended that this new characterization serve as a basis for the establishment of design criteria and regulations that pertain to ice protection systems and equipments for low performance aircraft which typically operate below 10,000 feet. This new characterization groups the supercooled cloud properties for all cloud types observed into three temperature ranges and presents their associated values of liquid water content (LWC), range of median volume droplet diameters (MVD), and icing event duration. Details of the analysis process are discussed which use a least squares logarithmic regression estimation technique to predict the extreme values of supercooled cloud properties. Author

N83-29923*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
ATMOSPHERIC OBSERVATIONS FOR STS-4 LANDING
Robert E. Turner, James E. Arnold, and Wade Batts (Computer Science Corp.) Jul. 1982 41 p refs
(NASA-TM-82495; NAS 1.15:82495) Avail: NTIS HC A03/MF A01 CSCL 04B

A summary of synoptic weather conditions existing over the western United States is given for the time of Shuttle descent into Edwards Air Force Base, California. The techniques and methods used to furnish synoptic atmospheric data at the surface and aloft for flight verification of the STS-4 Orbiter during its descent into Edwards Air Force Base are specified. Examples of the upper level data set are given. Author

N83-29924*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
THE 1980 STRATOSPHERIC-TROPOSPHERIC EXCHANGE EXPERIMENT
A. P. Margozzi, ed. Washington, D.C. Jun. 1983 425 p refs
(NASA-TM-84297; A-9093; NAS 1.15:84297) Avail: NTIS HC A18/MF A01 CSCL 04B

Data are presented from the Stratospheric-Tropospheric Water Vapor Exchange Experiment. Measurements were made during 11 flights of the NASA U-2 aircraft which provided data from horizontal traverser and samplings in and about the tops of extensive cirrus-anvil clouds produced by overshooting cumulus turrets. Aircraft measurements were made of water vapor, ozone, ambient and cloud top temperature, fluorocarbons, nitrous oxide, nitric acid, aerosols, and ice crystal populations. Balloonsondes were flown about twice daily providing data on ozone, wind fields, pressure and temperature to altitudes near 30 km. Satellite photography provided detailed cloud and cloud top temperature information. Descriptions of individual experiments and detailed compilations of all results are provided. S.L.

N83-29925*# National Aeronautics and Space Administration, Washington, D. C.
ACCURACY, REPRODUCIBILITY AND VERTICAL RESOLUTION OF DATA FROM RADIOSONDES
Hans Richner Oct. 1982 11 p refs Transl. into ENGLISH of conf. paper from the Symp. Anlaessich der 200Widerekehr des Gruendungjahres des Societas Meteorologica Palatina, 1980 p 42-45 Symp. held in Mannheim, West Germany, 1980 Original language document was announced as N82-20740 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-76949; NAS 1.15:76949) Avail: NTIS HC A02/MF A01 CSCL 04B

In a comparison of three radiosonde-systems typical data deviations as well as their reproducibility could be determined. Basic considerations regarding a possible vertical resolution are followed by a suggestion as to how the ascent velocity of the balloon could be utilized to determine vertical winds. Author

N83-29926*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE (STS-6) LAUNCH
D. L. Johnson, C. K. Hill, and G. W. Batts (Computer Sciences Corp., Huntsville, Ala.) May 1983 51 p refs
(NASA-TM-82529; NAS 1.15:82529) Avail: NTIS HC A04/MF A01 CSCL 04B

Selected atmospheric conditions observed near Space Shuttle STS-6 launch time on April 4, 1983, at Kennedy Space Center, Florida are summarized. Values of ambient pressure, temperature, moisture, ground winds, visual observations (cloud), and winds aloft are included. The sequence of prelaunch Jimsphere measured vertical wind profiles is given. Also presented are the wind and thermodynamic parameters measured at the surface and aloft in the SRB descent/impact ocean area. Final meteorological tapes, which consist of wind and thermodynamic parameters versus altitude, for STS-6 veicle ascent and SRB descent were constructed. The STS-6 ascent meteorological data tape was constructed by Marshall Space Flight Center in response to Shuttle task agreement No. 936-53-22-368 with Johnson Space Center. Author

N83-29927*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ON THE JOINT BIMODALITY OF TEMPERATURE AND MOISTURE NEAR STRATOCUMULUS CLOUD TOPS
David Randall Mar. 1983 31 p refs
(NASA-TM-85008; NAS 1.15:85008) Avail: NTIS HC A03/MF A01 CSCL 04B

The observed distributions of the thermodynamic variables near stratocumulus top are highly bimodal. Two simple models of sub-grid fractional cloudiness motivated by this observed bimodality are examined. In both models, certain low order moments of two independent, moist-conservative thermodynamic variables are assumed to be known. The first model is based on the assumption of two discrete populations of parcels: a warm-day population and a cool-moist population. If only the first and second moments are assumed to be known, the number of unknowns exceeds the number of independent equations. If the third moments are assumed to be known as well, the number of independent equations exceeds the number of unknowns. The second model is based on the assumption of a continuous joint bimodal distribution of

parcels, obtained as the weighted sum of two binormal distributions. For this model, the third moments are used to obtain 9 independent nonlinear algebraic equations in 11 unknowns. Two additional equations are needed to determine the covariance within the two subpopulations. In case these two internal covariance vanish, the system of equations can be solved analytically. Author

N83-29928# Science Applications, Inc., La Jolla, Calif.
IMPROVED SIMULATIONS OF MESOSCALE METEOROLOGY Contractor Report, Mar. 1977 - Dec. 1978
Purna C. Patnaik, Burton E. Freeman, Richard M. Traci, and Gary T. Phillips White Sands Missile Range, N. Mex. Atmospheric Sciences Lab. Jan. 1983 169 p refs
(Contract DAEA18-73-A-0127; DA Proj. 1L1-61102-B-53A)
(AD-A125815; SAI-093-82-005IJ; ERADCOM/ASI-CR-83-0127-1) Avail: NTIS HC A08/MF A01 CSCL 04/2

The improved description of mesoscale meteorology in regions of complex terrain was studied. The investigation is primarily theoretical and the development of several computer models that balance accuracy against economy of use are emphasized. The selection and formulation of suitable simplified physics models are studied. Two different classes of models are identified for development and implementation. A mass consistent wind field model is formulated that employs a terrain conformal coordinate system. The technique relies on observational data and is most suited to a data rich region. A computer program, VABMFT, was written, tests of the method were performed, and several comparisons with field data were carried out. The second class of model developed adheres more closely to first principles and thereby is applicable to data poor regions. Based on the linearized steady state Navier-Stokes equation, model LINMET is written, and the model performance is tested against field data. The primitive equation hydrostatic code SIGMET, which was developed at SAI for application to a number of meteorological programs, is adapted to the present program. The SIGMET simulations form the baseline case for two other simplified physics models. GRA

N83-29929# National Severe Storms Lab., Norman, Okla.
AUTOMATIC RECOGNITION OF MESOCYCLONES FROM SINGLE DOPPLER RADAR DATA Final Report, 1 Jul. - 30 Sep. 1982
Dusan S. Zrnic, Larry D. Hennington, and Julie Skelton Hanscom AFB, Mass. AFGL 7 Oct. 1982 47 p refs
(AF Proj. 2781)
(AD-A125854; AFGL-TR-82-0291; ESD-2-0949) Avail: NTIS HC A03/MF A01 CSCL 17/9

An algorithm to automatically detect mesocyclonic shear from radial velocity data of a Doppler radar is developed. The algorithm searches for azimuthally increasing velocities. Runs of increasing velocities are stored and the resulting shears are compared to mesocyclonic shear thresholds. Also, products of velocity differences are multiplied with the corresponding arc lengths and then compared to momentum thresholds. Those runs that pass a set of such thresholds and are spatially close are identified as belonging to a region of mesocyclonic shears or a shear line. The algorithm requires simultaneous storage and operation on two consecutive radials of data, and thus is suitable for real time implementation. Flow charts and performance on two data sets are presented. GRA

N83-29930# Weather Squadron (28th), (MAC), New York 09127. Detachment 18.
TERMINAL FORECAST REFERENCE NOTEBOOK FOR RAF FAIRFORD, UNITED KINGDOM Final Report
3 Jan. 1983 69 p refs
(AD-A126095) Avail: NTIS HC A04/MF A01 CSCL 04/2

Meteorological data was collected and processed to aid in the forecasting of weather for the facility at RAF Fairford. Author

N83-29931# Weather Squadron (7th), APO New York 09093. Detachment 1.
TERMINAL FORECAST REFERENCE NOTEBOOK FOR FEUCHT AAF, GERMANY Final Report
5 Jan. 1983 92 p
(AD-A126096) Avail: NTIS HC A05/MF A01 CSCL 04/2

A method of predicting the peak wind speed for a two hour period using hourly surface weather observations is discussed. Objective calculations result in an approximation of the wind speed; empericial modifications, accounting for local terrain effects, yield a final forecast for the runway level wind speed. Comparison is made between predicted and observed peak wind for the two hours after prediction time. GRA

N83-29932# Weather Squadron (7th), APO New York 09326. Detachment 5.
TERMINAL FORECAST REFERENCE NOTEBOOK FOR KATTERBACH AAF, GERMANY Final Report
3 Jan. 1983 79 p
(AD-A126097) Avail: NTIS HC A05/MF A01 CSCL 04/2

Katterbach AHP is located 25 miles WSW of Nuernberg. It is also 3 miles E of the city of Ansbach. The airfield is in the Eastern section of the Frankenhoehe. With an elevation of 1532 feet, there is a natural upslope motion into the Katterbach area. The Schwabische Alb and the Frankische Alb are other small hills that can effect the airfield area. There are no major rivers which effect Katterbach, however, small streams and valleys can often be a contributory factor to local fog problems. The predominant type of air mass that effects the local area is Maritime Polar. This air mass produces a typical maritime climate with mild winters and cool summers. The natural upslope motion with westerly winds is a weather producer. The various hills to the south and west do not have a significant effect on the local area. GRA

N83-29933# RCA Government and Commercial Systems, Princeton, N. J. Astro-Electronics Dept.
SATELLITE MOISTURE RETRIEVAL TECHNIQUES. VOLUME 1: TECHNIQUE DEVELOPMENT AND EVALUATION Final Report
A. Rosenberg, D. B. Hogan, and C. K. Bowman Monterey, Calif. NEPRF Jan. 1983 96 p refs 2 Vol.
(Contract N00228-81-C-H156)
(AD-A126245; NEPRF-CR-83-01) Avail: NTIS HC A05/MF A01 CSCL 04/2

The water vapor channels of the Special Sensor H-2 (SSH/2) of the Defense Meteorological Satellite Program (DMSP) are analyzed, and their ability to retrieve vertical profiles of moisture is studied. The sensitivity in the measured radiance for each channel to changes in water vapor amount made at levels throughout the troposphere is calculated. It is determined that the ability of the SSH/2, and indeed of any infrared sensor, to estimate the water vapor at levels near the surface is severely limited. A statistical retrieval technique that relies on correlations of atmospheric humidity with the observed SSH/2 radiances and estimates of the tropospheric temperatures it used to provide a first guess estimate of the moisture profile. This first guess profile is then corrected using a physical approach that inverts the radiative transfer equation. For a sample set of mid-latitude profiles this statistical-physical technique yields fraction root mean squared errors of about 25% for the region 400-700 mb, with errors of about 35% for regions nearer the surface. GRA

N83-29934# Naval Environmental Prediction Research Facility, Monterey, Calif.
EVALUATION OF THE TROPICAL CYCLONE SPIRAL LINEARIZATION TECHNIQUE Final Report
Steven D. Swadley Feb. 1983 47 p refs
(AD-A126007; NEPRF-TR-83-04) Avail: NTIS HC A03/MF A01 CSCL 04/2

An evaluation of the Spiral Lincarization Technique (SLT) for digital tropical cyclone satellite images was performed to test the method's usefulness as a research tool. A stepwise multiple regression analysis, using SLT-derived parameters as the independent variables to predict current intensity and intensity change, was carried out for eastern Pacific hurricanes Dolores and Enrique, 1979. The spirals traced out by the cloud bands were found to have much larger inflow angles than those of the

wind field, and it appears that the cloud band spirals can not be used as a tracer of the wind field spirals. The results of this project are sufficiently promising to warrant further investigation into the development of an objective technique to determine intensity changes utilizing parameters derived from digital infrared satellite images of tropical cyclones. GRA

N83-29935*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
CAPE CANAVERAL, FLORIDA RANGE REFERENCE ATMOSPHERE 0-70 km ALTITUDE
Annette Tingle, ed. White Sands Missile Range, N. Mex. Range Commanders Council Feb. 1983 209 p refs Supersedes RCC/MG-104-63
(NASA-TM-85253; NAS 1.15:85253; AD-A125553; RCC/MG-361-83; RCC/MG-104-63) Avail: NTIS HC A10/MF A01 CSCL 04/2

The RRA contains tabulations for monthly and annual means, standard deviations, skewness coefficients for wind speed, pressure temperature, density, water vapor pressure, virtual temperature, dew-point temperature, and the means and standard deviations for the zonal and meridional wind components and the linear (product moment) correlation coefficient between the wind components. These statistical parameters are tabulated at the station elevation and at 1 km intervals from sea level to 30 km and at 2 km intervals from 30 to 90 km altitude. The wind statistics are given at approximately 10 m above the station elevations and at altitudes with respect to mean sea level thereafter. For those range sites without rocketsonde measurements, the RRAs terminate at 30 km altitude or they are extended, if required, when rocketsonde data from a nearby launch site are available. There are four sets of tables for each of the 12 monthly reference periods and the annual reference period. GRA

N83-29936# University of Central Florida, Orlando. Dept. of Mathematics and Statistics.
SOME NEW PRACTICAL MODELS FOR VISIBILITY FOR GERMAN LOCATIONS WHERE NO RECORDS EXIST Progress Report, 15 Apr. - 3 Sep. 1982
P. N. Somerville and S. J. Bean Hanscon AFB, Mass. AFGL 3 Sep. 1982 19 p refs
(Contract F19628-82-K-0001; AF Proj. 6670)
(AD-A126339; AFGL-TR-82-0335; SR-3) Avail: NTIS HC A02/MF A01 CSCL 04/2

Given only month, time of day, and the elevation and surrounding elevations for an arbitrary location in Germany, models are developed for estimating probabilities of visibilities less than a specified distance. The two-parameter Weibull model is used. For a given month and hour period, the parameters are functions of elevation and average elevation of the surrounding region. The models are developed using a somewhat sophisticated nonlinear, least squares regression program. Evaluation is accomplished using 'sample-reuse,' a relatively new technique in which a valid independent evaluation of the model is made using the same observations used to develop the model. Author (GRA)

N83-29937# Houston Univ., Clear Lake, Tex. Studies of the Future Program.
ASSESSING VERY LONG-RANGE IMPACTS FROM A RAPID CLIMATE CHANGE
O. W. Markley and Paul R. Hall 1982 49 p refs
(Contract DE-AC01-79EV-10021)
(DE82-017229; DOE/EV-10021/T1) Avail: NTIS HC A03/MF A01

A variety of anthropogenic, or human-generated forces are gradually changing global climate. These include effects due to slash and burn agriculture, industrial particulates, waste heat and gasses such as chlorofluoromethanes, nitrous oxide, and carbon dioxide. Although the short-range effects of these forces may seem to be relatively minor from a long-range perspective, climatologists warn that the long-range effects - especially of increases in atmospheric carbon dioxide resulting from widespread fossil fuel use will be great, bringing significant alterations in atmospheric temperature, wind and ocean currents, precipitation patterns, and other ecological phenomena. From a geological time perspective, the resulting climate changes will occur quite rapidly, and will affect human concerns in a number of ways. Besides being important for long-range social planning, these effects are of intrinsic interest to futures research and impact assessment methodologists. DOE

N83-29938# Washington Univ., Seattle.
PHYSICAL CONSIDERATIONS IN THE ANALYSIS AND SYNTHESIS OF HYDROLOGIC SEQUENCES
K. Malcolm Leytham Jun. 1982 253 p refs
(Contract DI-14-34-0001-1151)
(PB83-167593; TR-76; OWRT-A-107-WA(1); OWRT-A-115-WA(1)) Avail: NTIS HC A12/MF A01 CSCL 04B

An investigation of univariate mixture models was undertaken including a study of the small sample properties of maximum likelihood parameter estimates for a mixture of two normal distributions. This study showed that while the parameters estimated from small unclassified samples are unreliable, the estimated quantiles compare favoraly with those estimated using classified data. Analysis of long rainfall records from southern British Columbia showed that while mixture distributions fitted the data well, they are too complex to be justified for single-site precipitation modeling. Multivariate mixture models also allow explicit recognition of the widespread nature of drought.
Author (GRA)

N83-29939# South Carolina Univ., Columbia. Office of Business Administration.
EARTHQUAKES AND EARTHQUAKE PREDICTIONS: SIMULATING THEIR ECONOMIC EFFECTS
R. Blaine Roberts, Jerome W. Milliman, and Richard W. Ellson 30 Sep. 1982 270 p refs
(Grant NSF PFR-80-19826)
(PB83-163725; NSF/CEE-82074) Avail: NTIS HC A12/MF A01 CSCL 05C

Research to develop a methodology for assessing the regional economic effects of earthquakes and earthquake predictions is summarized. Traditional regional economic models must be modified to account for: (1) supply side constraints; (2) the potential use of new or currently unused technologies; (3) the timing of investment decisions by firms and consumers; and (4) the decisions by firms and individuals to relocate in response to an event or the prediction of an vent. An alteration of the typical regional modeling method is presented in response to these requirements. Measures to determine economic losses from natural disasters are analyzed and shown to be defective. In five earthquake simulations, estimates of the present value of regional losses are made or various contingencies. GRA

N83-29940# National Oceanic and Atmospheric Administration, Rockville, Md. Federal Coodinator for Meteorological Services and Supporting Research.
NATIONAL SEVERE LOCAL STORMS OPERATIONS PLAN
Dec. 1982 52 p
(PB83-163998; FCM-P11-1983) Avail: NTIS HC A04/MF A01 CSCL 04B

This is the sixteenth of an annual series of National Severe Local Storms Operations Plans that was developed. It outlines the responsibilities of the various United States agencies which provide meteorological services in observing and forecasting severe local storms. GRA

N83-29941# National Severe Storms Forecast Center, Kansas City, Mo.
THE OPERATIONAL METEOROLOGY OF CONVECTIVE WEATHER. VOLUME 1: OPERATIONAL MESOANALYSIS
Charles A. Doswell, III Nov. 1982 169 p refs
(PB83-162321; NOAA-TM-NWS-NSSFC-5) Avail: NTIS HC A08/MF A01 CSCL 04B

Operational mesoanalysis is most often considered in the context of convective storms. Mesosystems significant to oper-

ational forecasting do not only encompass deep convection, as the patterns of heavy snowfall sometimes suggest. To accomplish operational mesoanalysis, one should have a thorough understanding of synoptic scale meteorology. Further, one should be familiar with convective storms and their dynamics. These notes cannot provide a working knowledge of both synoptic meteorology and the dynamics of convective storms. Material in these areas are covered in relationship to the process of mesoanalysis. GRA

N83-29942# National Weather Service, Silver Spring, Md.
MEAN MONTHLY, SEASONAL AND ANNUAL PAN EVAPORATION FOR THE UNITED STATES
Richard K. Farnsworth and Edwin S. Thompson Dec. 1982 92 p refs
(PB83-161729; NOAA-TR-NWS-34; NOAA-S/T-83-4) Avail: NTIS HC A05/MF A01 CSCL 04B

This publication is a compilation of monthly, seasonal, and annual averages of estimated pan evaporation based on observations from Class A pans and on meteorological measurements by the National Weather Service (NWS) and cooperating agencies. This report and its companion report, the evaporation atlas, should facilitate the determination of monthly values of evaporation at most points in the country. The data set used by the evaporation atlas included, at most, 15 years of data record. GRA

N83-29943# National Weather Service, Garden City, N.Y. Scientific Services Div.
AUTOMATED HOURLY WEATHER COLLECTIVE FROM HRR DATA INPUT
Lawrence Cedrone Jan. 1983 16 p
(PB83-167122; NOAA-NWS-ERCP-7; NOAA-83020701) Avail: NTIS HC A02/MF A01 CSCL 04B

The program documented produces an automated hourly weather roundup for transmission onto the Maryland/Delaware NOAA Weather Wire. The plain language hourly weather reports (cccHRRxxx) are extracted from the AFOS database and written into an RDOS file on disk. Upon completion, this file is stored into the database as an AFOS product for automatic transmission through the synchronous and asynchronous communication handlers. The file is then deleted from disk. The only forecaster input/activity is to execute the program from an ADM.
Author (GRA)

N83-29944# National Weather Service, Garden City, N.Y. Scientific Services Div.
REAL-TIME QUALITY CONTROL OF SAOS
John A. Billet Jan. 1983 34 p
(PB83-166082; NOAA-NWS-ERCP-6; NOAA-83020901) Avail: NTIS HC A03/MF A01 CSCL 04B

This program, SAOCHEC, examines an aviation observation for errors and, if it finds any, indicates what the errors are. If no errors are detected, the program sends the observtion out over AFOS addressed to ALL. The program is designed to provide real-time quality control for observations. Author (GRA)

N83-29945# North American Weather Consultants, Inc., Salt Lake City, Utah.
CONTINUING DESIGN WORK FOR THE SIERRA COOPERATIVE PILOT PROJECT Interim Report
R. D. Elliott, D. A. Griffith, J. A. Flueck (Flueck Associates), and J. F. Hannaford (Sierra Hydrotech) Nov. 1982 157 p refs
(Contract DI-7-07-83-V0008)
(PB83-164236; IR-5; SLWM-82-4) Avail: NTIS HC A08/MF A01 CSCL 04B

Simulation work of potential impacts of seeding in various observed conditions in the SCPP area was conducted through the utilization of a computer model (GUIDE) developed specifically for the SCPP. One version of GUIDE simulates the orographic water balance of SCPP storms. Another version simulates seeding signatures (either aerial or ground releases) first in the clouds and ultimately the fallout of precipitation sized particles to the ground. Author

N83-29946# Florida Univ., Gainesville. Sea Grant College Program.
PREDICTION OF HURRICANE STORM SURGES: A STATE-OF-THE-ART SURVEY
D. Lee Harris Nov. 1982 50 p refs
(Grant NA8011-D-00038)
(PB83-163915; SGR-49; NOAA-83013101) Avail: NTIS HC A03/MF A01 CSCL 04B

The prediction of coastal floods, the available technology for solving these problems, and, in some cases, of ongoing efforts to improve the technology are presented to give the non-specialists an understanding of the problems involved. Author

N83-29947# National Oceanic and Atmospheric Administration, Washington, D. C. National Earth Satellite Service.
PROCEEDINGS OF THE WEFAX USERS' CONFERENCE FOR NATIONAL AND INTERNATIONAL USERS OF GOES WEFAX SERVICES
Robert W. Popham and John L. Henderson Jun. 1982 106 p Conf. held at Lanham, Md., 28-29 Apr. 1981
(PB83-161117; NOAA-83011001) Avail: NTIS HC A06/MF A01 CSCL 04B

The history and purpose of WEFAX is discussed, and the evolution of the basic ground receiving stations is described. The WEFAX program and services, as well as plans are discussed.
S.L.

N83-29948# National Oceanic and Atmospheric Administration, Boulder, Colo. Air Resources Labs.
GEOPHYSICAL MONITORING FOR CLIMATIC CHANGE Summary Report
Barry A. Bodhaine, ed. and Joyce M. Harris, ed. Dec. 1982 169 p refs
(PB83-159905; Rept-10) Avail: NTIS HC A08/MF A01 CSCL 04B

This document presents a summary of the research operations and acomplishments by the Geophysical Monitoring for Climatic Change (GMCC) program and by outside investigators working cooperatively with GMCC in 1981. It includes descriptions of management and operations at GMCC's four baseline sites, scientific data from the measurement projects, conclusions from analyses of data, and recent basic research achievements. Background measurements of aerosols, gases, and solar radiation that are important to the climate of the Earth are made at the observatories. Author (GRA)

N83-29949# National Oceanic and Atmospheric Administration, Rockville, Md. Federal Coordinator for Meteorological Services and Supporting Research.
AUTOMATED WEATHER INFORMATION SYSTEMS (AWIS): CONSIDERATIONS FOR INTRA- AND INTERSYSTEM OPERATIONS AND INTERAGENCY CONSIDERATIONS IN DEVELOPMENT AND COORDINATION OF AWIS
Sep. 1982 73 p
(PB83-159848; FCM-R5-1982) Avail: NTIS HC A04/MF A01 CSCL 04B

The role of Automated Weather Information Systems (AWIS) in the Federal Government is increasing rapidly. Agencies are improving their systems daily, using the most up to date technology that is possible. Two major areas of concern that agencies face as the level of sophistication increases and as AWISs expand are coordination of the developing systems and the management of intra- and intersystem operations. This report addresses these areas and presents a number of factors which should be considered by all levels of management, particularly top management. Author (GRA)

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N83-29950# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Hydraulics Lab.

TIDAL INLET RESPONSE TO JETTY CONSTRUCTION Final Report
James M. Kieslich Oct. 1981 63 p refs
(AD-A112448; GITI-Rept-19) Avail: NTIS HC A04/MF A01 CSCL 13/2

Thirteen tidal inlets located on the Atlantic, gulf, and Pacific coasts of the continental United States were selected for a study of the response of inlet ocean entrances to manmade improvements. Inlet entrance behavior following jetty construction were evaluated and guidelines for the functional design of inlet entrance improvements are suggested. The inlets considered in the study were those where a single updrift or downrift jetty was built first. The construction of single jetties at inlet entrances has resulted in migration of the channel thalweg toward the jetty regardless of the inlet-bay orientation, the jetty angle with the shoreline, the position of the jetty relative to the direction of net longshore sediment transport, the ratio of net-to-gross transport, or the gross transport. In some cases, this has caused undermining of the jetty. For the inlets studied, the annual channel thalweg migration averaged 31 percent of the total distance available for migration following construction of a single updrift jetty, and 49 percent of the total distance available for migration following construction of a single downdrift jetty. Author

N83-29951# Naval Postgraduate School, Monterey, Calif.
FORMULATION OF A PROTOTYPE COUPLED ATMOSPHERIC AND OCEANIC BOUNDARY LAYER MODEL M.S. Thesis
Michael Charles OLoughlin Dec. 1982 91 p refs
(AD-A126000) Avail: NTIS HC A05/MF A01 CSCL 08/10

A prototype coupled Marine Atmospheric Boundary Layer (MABL) and Oceanic Boundary Layer (OBL) model, from physical models which have been separately formulated, is developed. The observational efforts will be directed toward coupling (local) point MABL and OBL features. Emphasis in the characterization of local features will be on the evolutions of the adjacent well-mixed layers. The approach will be to compare observed evolutions in the oceanic and atmospheric boundary layers with predictions from bulk models wherein the ocean influences the atmosphere through the surface temperature which, in turn, is influenced by atmospheric forcing. The atmospheric forcing parameters are the local surface turbulent fluxes and radiation. Surface turbulent fluxes are controlled by the surface temperature and atmospheric mixed layer parameters. Radiation is controlled by predicted cloud formation and dissipation. GRA

N83-29952# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. Numerical Modeling Div.
ON THE STRESS-SHEAR RELATION NEAR A TURBULENT AIR-SEA INTERFACE Interim Report
B. Edward McDonald Oct. 1982 17 p refs
(AD-A126252; NORDA-TN-181) Avail: NTIS HC A02/MF A01 CSCL 08/3

The average wind profile versus height for a nearly flat water surface roughened by capillaries is logarithmic down to a certain point, and must then approach the surface velocity smoothly at the time averaged surface. For lack of data, we hypothesize the form of the interfacial sublayer to be that of Liu, et al. (1979) for smooth flow with a modification in the dominant scale size to accommodate the transition from smooth to rough flow. The result implies that the surface shear increases with applied stress until roughness sets in. Then owing to increased turbulence at the interface, the shear may reach a maximum and decrease. If this were to hold true, there would be important implications for air-sea coupling in general, and wind wave generation mechanisms in particular. Author (GRA)

N83-29953# Massachusetts Inst. of Tech., Cambridge. Dept. of Meteorology and Physical Oceanography.
A LOW-ORDER MODEL OF A MOIST GENERAL CIRCULATION: FORMULATION AND TESTING Final Report, 1 Jan. 1981 - 31 Dec. 1982
Edward N. Lorenz Hanscom AFB, Mass. AFGL 31 Jan. 1983 42 p refs
(Contract F19628-81-K-0001)
(AD-A126331; AFGL-TR-83-0026) Avail: NTIS HC A03/MF A01 CSCL 04/2

A model of a moist general circulation is constructed. The basic dependent variables are the stream function, velocity potential, individual pressure change, air temperature, total dew point, and ocean temperature. The model is simplified first by assigning a vertical structure to each variable, so that values of the variables at the ocean-atmosphere interface may be used as new variables. The new variables are then expanded in highly truncated series of orthogonal functions. Quasi-geostrophic beta-plane dynamics are used. The diabatic processes are evaporation and precipitation, transfer of sensible and latent heat, and short-wave and long-wave radiation; solar radiation drives the circulation. Preliminary numerical solutions show that the model produces qualitatively reasonable patterns, occuring in qualitatively reasonable sequence. Extended time intervals are sometimes required for initial transient conditions to die out. For suitably chosen solar heating, two stable equilibrium states, a cold state and a warm state, are alternative possible outcomes. Author (GRA)

N83-29954# Naval Postgraduate School, Monterey, Calif. Dept. of Computer Science.
A DISTRIBUTED NETWORK SUPPORTING OCEAN SURVEILLANCE M.S. Thesis
Stavros Vassiliou Oct. 1982 171 p refs
(AD-A125559) Avail: NTIS HC A08/MF A01 CSCL 09/2

The improvements in computational efficiency, expandability, flexibility and cost that can be achieved in the solution of the Ocean Surveillance problem by the use of recently introduced technology are demonstrated. A preliminary design of the surveillance portion of a conceptual model of a fault tolerant distributed Command, Control and Communications system is carried out. The proposed system consists of a long haul fiber-optic ring network. Each one of its nodes has a similar multicomputer architecture for the manipulation of data collected by a variety of detection sensors. The performance prediction of the proposed model is included as well. GRA

N83-29955# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. Advanced Sensor and Survey Branch.
A PLAN FOR OPTICAL OCEANOGRAPHY R&D TO SUPPORT MC&G Final Report
Duane C. Bright Jan. 1983 24 p
(AD-A126215; NORDA-TN-201) Avail: NTIS HC A02/MF A01 CSCL 05/1

This study was undertaken to determine a course of action for NORDA to provide a balanced R/D program in optical oceanography to support MC/G requirements. Aspects considered in this analysis include an initially broad view of general MC/G requirements for ocean optics, a review of existing programs, sponsors and funding in ocean optics, and an assessment of available NORDA resources in ocean optics. Current technical literature in ocean optics and optical instrumentation was also reviewed to establish the current state of knowledge and technology. An integrated coastal ocean optics program covering basic research, exploratory development, and advanced development, using all relevant available NORDA resources is recommended. This work was funded by Dr. J. Andrews, NORDA Technical Director, under Program Element 65861N. GRA

N83-29956# Woods Hole Oceanographic Institution, Mass. Dept. of Physical Oceanography.
THE LONG TERM UPPER OCEAN STUDY (LOTUS) CRUISE SUMMARY AND HYDROGRAPHIC DATA REPORT OCEANUS 119, MAY 1982
Richard P. Trask and Melbourne G. Briscoe Feb. 1983 47 p refs
(Contract N00014-76-C-0197; NR Proj. 083-400)
(AD-A125737; WHOI-83-7) Avail: NTIS HC A03/MF A01 CSCL 08/10

OCEANUS cruise number 119 (6-14 May 1982) was the seventh in a series of cruises to the Long Term Upper Ocean Study (LOTUS) area centered at 34 N, 70 W. During this cruise five moorings were set at the LOTUS site; four for the LOTUS experiment and one, a profiling current meter mooring, for C.S. Draper Labs MIT. In addition, an engineering mooring was set at 39 deg 30 min N, 70 W. Two XBT sections were made along 70 W between 40 N and 33 N during the trip to and from the LOTUS site. Five CTD stations were also completed in the LOTUS area. Part I of this report is a summary of the major cruise activities and part II presents the hydrographic data (CTD and XBT) collected during the cruise. GRA

N83-29957# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Hydraulics Lab.
A NUMERICAL MODEL FOR WIND-WAVE PREDICTION IN DEEP WATER Final Report
Donald T. Resio and Barbara A. Tracy Jan. 1983 71 p refs
(AD-A125985; WIS-12) Avail: NTIS HC A04/MF A01 CSCL 08/3

This report contains a description and listing of a numerical wave hindcast model similar to that used to calculate 20 years of wave conditions in the Atlantic Ocean as part of the Wave Information Study. For a specified spatial grid, the model takes input time sequences of wind velocity and calculates the directional wave spectrum from which parameters such as significant wave height, frequency of peak energy density, and mean wave direction can be deduced. Instructions on how to set up the input and output for the model are given and a discussion of the model's limitations is provided. Author (GRA)

N83-29958# Sandia Labs., Albuquerque, N. Mex. Seabed Programs Div.
CONSTANT TEMPERATURE AND THERMAL GRADIENT INVESTIGATIONS OF THE NEAR FIELD SUBSEABED ENVIRONMENT: CHEMICAL AND THERMODIFFUSIONAL EFFECTS
E. C. Thornton and W. E. Seyfried, Jr. 1982 15 p refs Presented at the Mater. Characterization Center Workshop on Leaching, Gaithersburg, Md., 19-21 May 1982 Prepared in cooperation with Minnesota Univ., Minneapolis
(Contract DE-AC04-76DP-00789)
(DE82-018589; SAND-82-1199C; CONF-820570-3) Avail: NTIS HC A02/MF A01

Both constant temperature and temperature gradient experiments were conducted to examine interactions of seawater with sediment from study area 1000 km north of Hawaii. Solutions were sampled at experimental temperatures and pressure (500 or 600 bars). The results of the experimental studies presented illustrates that the chemistry of the near field environment is determined by a combination of water-rock interaction and thermal diffusion effects. Most important with respect to a thermal gradient is the thermal diffusion effect which results in large scale fluxes of Na and C1 from the hot zone towards the cool zone. This phenomenon serves to markedly decrease the ionic strength of the hot zone. Other elements, however, appear to be influenced by water-rock interaction processes as well as thermal diffusion. The behavior of Mg is particularly important in this regard because of its potential of generating an acidic environment in the near field region. DOE

N83-29959# National Ocean Survey, Rockville, Md.
US COAST PILOT 1. ATLANTIC COAST: EASTPORT TO CAPE COD (19TH EDITION)
Jan. 1983 305 p
(PB83-157537) Avail: NTIS HC A14/MF A01 CSCL 13J

The National Ocean Survey Coast Pilots are a series of nine nautical books that cover a wide variety of information important to navigators of U.S. coastal an intracoastal waters, and waters of the Great Lakes. Coast Pilot subjects include navigation regulations, outstanding landmarks, channel and anchorage Peculiarities, dangers, weather, ice, freshets, routes, pilotage, and port facilities. Author

N83-29960# National Oceanic and Atmospheric Administration, Seattle, Wash. Pacific Marine Environmental Lab.
VERTICAL SECTIONS OF TEMPERATURE, SALINITY, THERMOSTERIC ANOMALY, AND ZONAL GEOSTROPHIC VELOCITY FROM NORPAX SHUTTLE EXPERIMENT, PART 3
Bruce A. Taft, Alan Cantos-Figueroia (Washington Univ., Seattle), and Paavo Kovala (Washington Univ., Seattle) Sep. 1982 98 p
(PB83-169961; NOAA-DR-ERL-PMEL-7; NOAA-83022306) Avail: NTIS HC A05/MF A01 CSCL 08J

The NORPAX Hawaii-Tahiti shuttle experiment was carried out in the central Pacific during the period February 1979 to June 1980. The CTD profiling data from legs 11-15 of the Shuttle (January 1980-June 1980) are reported. Vertical sections of temperature, salinity, thermosteric anomaly and zonal geostrophic velocity are presented. Meridional profiles of surface temperature, surface salinity, surface thermosteric anomaly and geostrophic volume transport relative to 1000 db are included. GRA

N83-29961# Planologisch Studiecentrum TNO, Delft (Netherlands).
MEANING AND CONSTRUCTION OF A GEOGRAPHIC BASE FILE FOR A SPATIALLY ORIENTED INFORMATION SYSTEM
Jan vanEst and Frans deFroege Oct. 1982 32 p refs
(PB83-166108; WERKSTUK-26) Avail: NTIS HC A03/MF A01 CSCL 08A

The special meaning of the spatial dimension of a spatial orientated information system is discussed. The meaning of a map for such a system is considered and the necessary conditions were given. The construction itself is outlined. In the Netherlands, many municipalities already have computerized files, showing street side characteristics, which in fact are part of a segmented geographic base file. The consequences of their existence for construction are the files concerned were studied in a feasibility study for the city of Rotterdam. A summarized version of this is presented. The framework of a spatial orientated information system is outlined. Some findings from the Rotterdam study are included. GRA

N83-29962# Planologisch Studiecentrum TNO, Delft (Netherlands).
DATA SOURCE AND INFORMATION CARRIER AS A BASE FOR A SPATIAL-ORIENTATED INFORMATION SYSTEM
Jan vanEst and Frans deVroege Sep. 1982 38 p refs
(PB83-166090; WERKSTUK-25) Avail: NTIS HC A03/MF A01 CSCL 08A

The necessary conditions for a proper introduction of the spatial dimension will be further elaborated. In the second section the planning environment and consequences thereof will be outlined. The problems with the registration of data will be discussed in section three, while the aspects of a data carrier will be discussed in section four. In section five the framework of a spatially orientated information system will be outlined. This paper will be concluded with the presentation of a few examples. Author (GRA)

N83-29963# National Oceanic and Atmospheric Administration, Washington, D. C.
SATELLITE INFRARED OBSERVATIONS OF OCEANIC LONG WAVES IN THE EASTERN EQUATORIAL PACIFIC 1975 TO 1981
Richard Legeckis Nov. 1982 113 p refs
(PB83-161133; NOAA-TR-NESS-92; NOAA-83011303) Avail: NTIS HC A06/MF A01 CSCL 08J

Geostationary satellite observations of a zonally oriented sea surface temperature front in the eastern equatorial Pacific have been made between 1975 and 1981. Long waves appear along the front mainly during the summer and fall except during 1976 the year of an El Nino. The waves have average periods of 25 days and wavelengths of 1000 kilometers. At the end of 1981, the long waves were also detected in a new sea surface temperature analysis based on multi-channel infrared measurements from a polar orbiting satellite. Author (GRA)

N83-29964# National Oceanic and Atmospheric Administration, Rockville, Md. Office of Ocean Technology and Engineering Services.
AIRBORNE LASER HYDROGRAPHY, FY 1983. ISSUE PAPER
David B. Enabnit May 1982 98 p refs
(PB83-158451; NOAA-TM-OTES-4; NOAA-83011208) Avail: NTIS HC A05/MF A01 CSCL 08J

The approval, funds, and positions required to develop and operate an airborne laser hydrography system was solicited. The goal is to use airborne laser hydrography to reduce the cost and manpower required for shallow water hydrographic surveys. GRA

N83-29965# Woods Hole Oceanographic Institution, Mass.
FRICTIONAL SECONDARY CIRCULATION NEAR AN UPWELLED THERMOCLINE
G. T. Csanady Dec. 1982 34 p refs Sponsored in part by NOAA, Ann Arbor, Mich.
(PB83-162024; WHOI-82-52) Avail: NTIS HC A03/MF A01 CSCL 08C

A first order, linear analysis of thermocline upwelling shows that a quasigeostrophic baroclinic jet accompanies the upwelling. The secondary circulation induced in such a flow field in a meridional plane by turbulent friction is investigated. A double Ekman layer is found to form at the thermocline, of a few meters in thickness. The suction of this Ekman layer destroys the primary flow by the 'spin-up' mechanism in a period of which the order of magnitude is tentatively estimated at 100 hrs. Thus the primary flow must be reestablished by successive, reasonably frequent wind-stress impulses to maintain a quasi-stationary upwelling. The lower side Ekman layer on the thermocline is fed from a free shear layer underneath the free surface-thermocline intersection, which thus becomes an upwelling zone. Author (GRA)

N83-29966# National Oceanic and Atmospheric Administration, Seattle, Wash. Pacific Marine Environmental Lab.
FEASIBILITY STUDY OF MITIGATING TSUNAMI HAZARDS IN THE PACIFIC
Eddie N. Bernard, James F. Lander (National Geophysical Data Center, Boulder, Colo.), and Gerald T. Hebenstreit (Science Applications, Inc., McLean, Va.) Dec. 1982 49 p refs
(PB83-156885; NOAA-TM-ERL-PMEL-37) Avail: NTIS HC A03/MF A01 CSCL 08C

This study shows that many aspects of existing U.S. technology have potential applications to the problem of providing early tsunami warning information in developing nations of the Pacific which do not have their own regional warning network. A simple conceptual model is developed which shows how these technologies could be integrated into an early warning 'system'. Such a demonstration, to which the acronym' THRUST (Tsunami Hazard Reduction Utilizing System Technology) is applied, would be a significant step toward achieving the goal of hazard mitigation in the developing areas of the Pacific community. Author (GRA)

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N83-29967# North Carolina Biotechnology Center, Research Triangle Park.
BIOTECHNOLOGY: THE FORGING OF MULTIDISCIPLINARY STRATEGIES FOR RESEARCH IN BIOMOLECULAR ELECTRONICS, MATERIALS SCIENCES AND MICROECOLOGY Final Report, 31 Oct. 1982 - 30 Oct. 1983
Dec. 1982 126 p
(Contract N00014-83-G-0010)
(AD-A125799) Avail: NTIS HC A07/MF A01 CSCL 06/2

The North Carolina Biotechnology Center conducted a series of three workshops on the general theme, 'Biotechnology: The Forging of Multidisciplinary Strategies for Research.' The workshops were designed to cover areas of common interest to the Navy and North Carolina scientists and engineers. Each workshop explored the opportunities presented by the merging of biotechnology into a particular area: these three areas were (1) Biomolecular Electronics, (2) Materials, Sciences, and (3) Microecology. The series of workshops had two main objectives: (1) To discover, through experimenting with this strategy, the best approach for melding the perspectives of biologists, chemists, physicists, and engineers into a cohesive whole, and (2) To develop outlines for feasible interdisciplinary research programs. GRA

N83-29968# Michigan State Univ., East Lansing. Dept. of Biomechanics.
MECHANICAL PROPERTIES OF THE SPINAL LIGAMENTS OF PRIMATES. PART 1: CYCLIC LOADING. PART 2: MATHEMATICAL MODELING Final Report
Robert Wm. Little, Robert P. Hubbard, and Arnold R. Slonim Wright-Patterson AFB, Ohio AFAMRL Feb. 1983 43 p refs
(Contract F33615-79-C-0514; AF Proj. 7231)
(AD-A125540; AFAMRL-TR-83-0005) Avail: NTIS HC A03/MF A01 CSCL 06/19

This report is composed of two parts covering the response of spinal ligaments to cyclic creep and a mathematical model of those ligaments to a specified strain history. Four ligaments of the spine of rhesus monkey and baboon were selected for testing with test samples taken at different vertebral levels. The cyclic creep tests on ligaments from three rhesus monkeys and two baboons were preceded by single extension failure tests on ligaments from two rhesus monkeys to establish a range of static failure. In Part 2, a mathematical constitutive equation was developed using a linear viscoelastic model for individual fibers and a distribution function to include the effects of fiber distribution, orientation and initial length. Material constants and the distribution function were determined by numerical solution of the constitutive integral equation using the fastest strain rate data. Analytical and experimental results were compared for selected human spinal ligament samples. This research completes an initial investigation of the mechanical properties of spinal ligaments from the lower extremities. Research of this nature is necessary to understand the mechanism of injuries in aircrewmen that result from exposure to vibratory loading environments and high stress or strain rates during escape and crash episodes. GRA

N83-29969# Dayton Univ., Ohio.
SOME VIBRATION DATA ON PRIMATES IMPLANTED WITH ACCELEROMETERS ON THE UPPER AND LOWER SPINE: METHODOLOGY AND RESULTS IN RHESUS MONKEYS
Arnold R. Slonim Wright-Patterson AFB, Ohio AFAMRL Feb. 1983 85 p refs
(Contract F33615-79-C-0509; AF Proj. 7231)
(AD-A125545; AFAMRL-TR-81-153) Avail: NTIS HC A05/MF A01 CSCL 06/19

A technique was developed to measure on a daily basis the impedance and transmissibility response in primates subjected to low frequency, sinusoidal vertical vibrations. The technique involved the surgical implantation of two accelerometers on the spinous processes of monkeys at the upper thoracic and lower lumbar levels, respectively. Four Rhesus monkeys were exposed to sinusoidal vibration from 4 to 50 Hz at 0.25 and 0.40 peak Gz acceleration levels, respectively. The impedance and transmissibility responses were linear over this narrow acceleration range, although the tendency towards non-linearity existed with all four monkeys individually or as a group. Impedance magnitude, impedance phase and transmissibility between seat and spinal accelerometers were discussed in terms of the reproducibility of the data and variability within the same animal and between animals. The various factors that could contribute to the intraindividual and interindividual variabilities as well as suggestions to establish standards in methodology were presented. The application of the impedance magnitude, phase angle and transmissibility data to interspecies scaling and validation of biodynamic models was discussed briefly. Author (GRA)

N83-29970# Alabama Univ., University. Dept. of Biology.
EFFECTS OF URANIUM OXIDES ON SOME OF THE ALGAE

NATIVE TO EGLIN AIR FORCE BASE, FLORIDA Final Report, Feb. 1977 - Sep. 1979
Temd R. Deason Eglin AFB, Fla. AFATL Jun. 1982 92 p refs (Contract F08635-77-C-0047; AF Proj. 06AL)
(AD-A125478; AFATL-TR-82-40) Avail: NTIS HC A05/MF A01 CSCL 08/1

Population studies were made for algae collected from creeks on the Eglin Air Force Base reservation in Northwest Florida. Cultures of several of the algal species found in the creeks were isolated and exposed to various concentrations of UO2 and U308 to determine how the algae responded, how much uranium they took up, and what uptake mechanism was involved. Factors related to mobility of uranium on the reservation are discussed.
Author (GRA)

N83-29971# Letterman Army Inst. of Research, San Francisco, Calif. Div. of Combat Casualty Care.
DOMESTIC SWINE IN PHYSIOLOGICAL RESEARCH. PART 4: A BLOOD ACID-BASE CURVE NOMOGRAM FOR IMMATURE PIGS Interim Report, Jun. - Dec. 1982
John P. Hannon Feb. 1983 36 p refs
(DA Proj. 3M1-61102-BS-10)
(AD-A126081; LAIR-137) Avail: NTIS HC A03/MF A01 CSCL 06/16

The normal acid-base characteristics of porcine blood have been poorly defined, largely because of procedural differences in animal handling, blood sampling, and measurement techniques. Consequently, 40 immature, 20- to 31 kg domestic pigs were used to establish population characteristics for arterial blood. Samples were collected from chronically implanted catheters while the animals were maintained under steady state, near-basal conditions. Hourly measurements over a 6-hour period in 6 of these pigs showed a small but significant decrease in P O2, with time but no significant change in acid-base status. The data showed that nomograms or other procedures based on human blood characteristics were invalid when used to estimate base excess concentration of porcine blood. The normal pH of arterial blood was higher in pigs than in humans; hence, parameters defining zero base excess differed in the two species. Consequently, constant P CO2 titrations were performed on arterial samples taken from 10 pigs and the data were used to construct an acid-base curve nomogram in which zero base excess was defined for blood with a pH of 7.50 and a P CO2 of 40 torr. GRA

N83-29972# Nebraska Univ., Lincoln.
BIOCHEMICAL AND PHYSIOLOGICAL CHARACTERIZATION OF HIGHER PLANTS WITH REDUCED PHOTORESPIRATION Progress Report, 1 Mar. 1982 - 1 Mar. 1983
Raymond Chollet 1983 5 p refs
(Contract DE-AC02-81ER-10902)
(DE83-007949; DOE/ER-10902/2) Avail: NTIS HC A02/MF A01

Progress is reported in the following research areas: (1) photosynthetic carbon metabolism in naturally occurring higher plants with reduced photorespiration; and (2) physicochemical analysis of higher plant and bacterial ribulosebiphosphate carboxylase/oxygenase (RuBisCO). DOE

N83-29973# Joint Publications Research Service, Arlington, Va.
USSR REPORT: LIFE SCIENCES. EFFECTS OF NONIONIZING ELECTROMAGNETIC RADIATION, NO. 10
23 Jun. 1983 74 p refs Transl. into ENGLISH from various Russian articles
(JPRS-83745) Avail: NTIS HC A04

Several areas of life science are addressed including the effects of microwave electromagnetic energy, use of magnet in medical treatment, morphological changes in neurons, hepatic circulation, brain and liver metabolism, and oxidative phosphorylation of organ mitochondria. For individual titles, see N83-29974 through N83-29987.

N83-29974# Joint Publications Research Service, Arlington, Va.
AUTOALLERGIC EFFECTS OF MICROWAVE ELECTROMAGNETIC ENERGY AND THEIR INFLUENCE ON THE FETUS AND OFFSPRING
M. G. Shandala and G. I. Vinogradov *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 10 (JPRS-83745) 23 Jun. 1983 p 1-4 refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 10, Oct. 1982 p 13-16 (For primary document see N83-29973 18-51)
Avail: NTIS HC A04

Wide use of microwave generators, the increasing number of people subjected to the effects of microwaves, and the difficulties of protection against the effects of powerful antenna fields of radar stations have brought the problem of the biological effects of microwaves to the forefront. The effects of autoimmune processes occuring in the organism of a pregnant female animal on the development of the fetus and the offspring when it is irradiated by microwave energy were investigated. Author

N83-29975# Joint Publications Research Service, Arlington, Va.
EFFECT OF LOW-INTENSITY SUPERHIGH-FREQUENCY ENERGY ON RESPIRATION AND OXIDATIVE PHOSPHORYLATION OF ORGAN MITOCHONDRIA AND ACTIVITY OF SOME BLOOD ENZYMES
M. I. Rudnev, N. Ye. Tarasyuk, and A. D. Kulikova *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 10 (JPRS-83745) 23 Jun. 1983 p 5-8 refs Transl. into ENGLISH from Vrach. Delo (USSR), no. 11, Nov. 1982 p 93-95 (For primary document see N83-29973 18-51)
Avail: NTIS HC A04

Electromagnetic fields in the superhigh frequency range (SHF) have considerable penetration capacity and affect various organs and functions of the body. A change in morphology and biochemical functions of mitochrondria could serve as a sensitive indicator of the state of a cell and its reactions to diverse environmental agents, including SHF fields. Superhigh frequency energy delivered to the organism elicits changes in respiration and oxidative phosphorylation of liver mitochronaria, and lowers the activity of several enzymatic systems. Author

N83-29976# Joint Publications Research Service, Arlington, Va.
PROBLEMS OF STUDYING THE BIOLOGICAL EFFECT OF ELECTROMAGNETIC FIELDS DISCUSSED
I. N. Gorbach and B. A. Luchevskiy *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 10 (JPRS-83745) 23 Jun. 1983 p 9-13 refs Transl. into ENGLISH from Zdravookh. Beloruss. (USSR), no. 2, Feb. 1983 p 30-32 (For primary document see N83-29973 18-51)
Avail: NTIS HC A04

The problem of the biological effect of electromagnetic fields (EMF) is extremely pressing. Its significance and urgency are growing as time goes on. Successful resolution of this problem is only possible as a result of integrated research both in the field of direct EMF radiation on humans and animals, and theoretical research involving a broad group of specials. The primary focus should be on developing a united methodological approach to planning and conducting research. Author

N83-29977# Joint Publications Research Service, Arlington, Va.
EFFECT OF CORDIAMINE AND MESATONE ON ECG UNDER CONDITIONS OF ACUTE MICROWAVE IRRADIATION
V. M. Koldayev *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 10 (JPRS-83745) 23 Jun. 1983 p 14-18 refs Transl. into ENGLISH from Farmakol. Toksikol. (USSR), v. 45, no. 5, Sep. - Oct. 1982 p 57-59 (For primary document see N83-29973 18-51)
Avail: NTIS HC A04

Acute microwave irradiation of animals causes a disturbance in cardiac which is one of the causes of their death. It is well known that some analeptics and adrenomimetic substances increase the survival rate of animals irradiated with microwaves. However, the effect of the indicated agents on the heart under conditions of acute microwave irradiation was not studied earlier. The effect of cordiamine and mesatone on the ECG of micr after acute microwave irradiation in various doses was investigated in this work. Author

N83-29978# Joint Publications Research Service, Arlington, Va.
LOCAL USE OF MICROWAVE ELECTROMAGNETIC ENERGY ON BIOLOGICALLY ACTIVE POINTS
Yu. Ye. Vagin and V. A. Shestiperov *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 10 (JPRS-83745) 23 Jun. 1983 p 19-23 refs Transl. into ENGLISH from Biol. Nauki (USSR), no. 1, Jan. 1983 p 40-43 (For primary document see N83-29973 18-51)
Avail: NTIS HC A04

Use of superhigh frequency electromagnetic energy to stimulate biologically active points makes it possible to pinpoint emission of electromagnetic field energy in the region of the points. Exposure to a field at a frequency of 2375 MHz and intensity that elicits heating of active point tissues produces reflex changes in somatovegetative parameters of animals. The demonstrated changes are mild and reversible. Author

N83-29979# Joint Publications Research Service, Arlington, Va.
INFLUENCE OF PROLONGED ILLUMINATION OF THE RABBIT RETINA BY MONOCHROMATIC LIGHT ON ITS FUNCTIONAL STATE
A. B. Butman and O. A. Maslakov *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 10 (JPRS-83745) 23 Jun. 1983 p 24-28 refs Transl. into ENGLISH from Gig. Tr. i Prof. Zabol. (USSR), no. 1, Jan. 1983 p 38-40 (For primary document see N83-29973 18-51)
Avail: NTIS HC A04

Prolonged (45 minute) multiple diffuse exposure of the rabbit retina to monochromatic radiation in the bluegreen portion of the spectrum at power densities significantly below the thresholds of changes in the fundus oculi can lead to pronounced, stable inhibition of the functional state of the visual analyzer's peripheral division. The most pronounced inhibition of the amplitude of the electroretinogram (ERG) b wave recorded from the rabbit eye (an average of 60 percent in comparison with the initial level) was observed following a relatively lengthy period after exposure (60-90 days). Inhibition of the ERG was also recorded for the opposite, nonirradiated eye (by as much as 30 percent) in this case. It would be suitable to turn attention to changes in the functional state of the visual analyzer when considering hygienic standards for prolonged multiple laser irradiation. Author

N83-29980# Joint Publications Research Service, Arlington, Va.
DEPENDENCE OF BIOLOGICAL EFFECTS OF MICROWAVE IRRADIATION ON EXPOSURE INTENSITY AND DURATION
Ye. A. Lobanova, I. P. Sokolova, I. A. Kitsovskaya, N. B. Rubtsova, and Ye. K. Lebed *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 10 (JPRS-83745) 23 Jun. 1983 p 29-36 refs Transl. into ENGLISH from Gig. Tr. i Prof. Zabal. (USSR), no. 1, Jan 1983 p 30-35 (For primary document see N83-29973 18-51)
Avail: NTIS HC A04

The objective of the work was to study the relationship between the biological effect and the intensity and duration of microwave exposure. Published data on this question are extremely meager, and they pertain to studies performed at high radiation levels accompanied by thermal effects. The results of these studies indicate that at radiation levels producing thermal effects, a nonlinear dependence exists between the biological effect and irradiation intensity. The biological effectiveness of nine different modes of exposure to microwaves in the 10 centimeter range with power flux densities (PFD) from 0.25 to 10 mw/square cm and an exposure time from 25 to 240 minutes, using indicators characterizing the functional state of the central nervous system and the neuroendocrine system, immunological reactivity and embyrogenesis was evaluated. Total irradiation time varied from 3 weeks to 4.5 months. The dependence between the biological effect and exposure intensity and duration was determined in relation to identical temporal, power and energy characteristics of irradiation. Author

N83-29981# Joint Publications Research Service, Arlington, Va.
METABOLISM OF THE BRAIN AND LIVER AFTER EXPERIMENTAL EXPOSURE TO SUPER HIGH-FREQUENCY FIELDS OF NON-THERMAL INTENSITY
V. S. Belokrinitskiy and L. A. Tomashevskaya *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 10 (JPRS-83745) 23 Jun. 1983 p 37-40 Transl. into ENGLISH from Vrach. Delo (USSR), no. 10, Oct. 1982 p 115-118 (For primary document see N83-29973 18-51)
Avail: NTIS HC A04

One of the main biological effects of electromagnetic waves is their influence on the functional state of the brain, which itself immediately and directly involves the disruption of other functions. The intensity of the electromagnetic waves and the initial condition of the organism determine both the degree of the changes that occur and the ability to develop compensatory-adaptive reactions based on metabolic processes. Since the disruption of energy exchange plays the role of a triggering mechanism in the development of subsequent metabolic and functional disorders, special attention has been focused on studying the activity of enzymes which catalyze processes of energy formation, and processes of oxidative phosphorylation and glycolysis. B.W.

N83-29982# Joint Publications Research Service, Arlington, Va.
STATE OF HEPATIC CIRCULATION IN RESPONSE TO COMBINED EFFECT OF LEAD AND ELECTROMAGNETIC FIELDS
M. S. Trinos and Ye. A. Oderiy *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 10 (JPRS-83745) 23 Jun. 1983 p 41-44 refs Transl. into ENGLISH from Vrach. Delo (USSR), no. 8, Aug. 1982 p 109-111 Previously announced as 83A-17159 (For primary document see N83-29973 18-51)
Avail: NTIS HC A04

In recent years the national economy has been making broad use of the energy of radio frequencies combined with other factors of the production environment. In some production operations lead vapor can be detected in the air around workplaces in addition to electromagnetic fields of nonthermogenic intensity (in radio engineering industry and elsewhere), One of the most sensitive indicators of the effect of superhigh-frequency electromagnetic fields and lead vapor is the state of regional hemodynamics. Hepatic circulation was evaluated using radioisotope diagnosis and rheohepatography (RHG). The latter method has enjoyed extensive application in connection with the ease with which it could be used outside the hospital, and its adequacy to solving the posed problems. Matveykov and Pshonnik and Shershnev describe changes in the RHG in response to different diseases of the liver and bile ducts, and they point out that this method can be used to determine the state of hepatic blood flow. B.W.

N83-29983# Joint Publications Research Service, Arlington, Va.
MORPHOLOGICAL CHANGES IN NEURONS OF THE CENTRAL NERVOUS SYSTEM IN RESPONSE TO EXPERIMENTAL INFLUENCE OF CENTIMETER-RANGE ELECTROMAGNETIC WAVES ON THE BODY
V. S. Belokrinitskiy *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 10 (JPRS-83745) 23 Jun. 1983 p 45-50 refs Transl. into ENGLISH from Vrach. Delo (USSR), no. 8, Aug. 1982 p 105-109 (For primary document see N83-29973 18-51)
Avail: NTIS HC A04

The purpose of this work was to make morphological studies of the central nervous system following exposure of the body to electromagnetic waves, and to tie the structural changes in with published clinical physiological data on the action of this factor in man's environment. To reach this objective an experiment was conducted on animals (dogs, cats) that were exposed to electromagnetic waves, and then we studied the dynamics of the morphological state of the central nervous system during development of the process. The brain and spinal cord were studied for this purpose on the 1st, 10th, 20th and 30th days after irradiation. B.W.

N83-29984# Joint Publications Research Service, Arlington, Va.
ACTION OF INDUSTRIAL FREQUENCY ELECTRIC FIELD ON

INDICATORS OF NATURAL IMMUNITY
S. A. Lyubchenko *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 10 (JPRS-83745) 23 Jun. 1983 p 51-54 refs Transl. into ENGLISH from Vrach. Delo (USSR), no. 8, Aug. 1982 p 103-105 (For primary document see N83-29973 18-51)
Avail: NTIS HC A04

This work represents part of a multifaceted experimental study of animals and of observations of volunteers made by the Kiev Scientific Research Institute of General and Communal Hygiene with the purpose of studying the influence of industrial frequency electromagnetic energy on the immunological system. Almost around the clock (22 hour) exposure of rabbits (two groups of six animals each weighing 2-2.5 kg) to an industrial frequency EMF in a chronic experiment (lasting 2 months) revealed significant changes in the results for an experimental group subjected to a 1,000 v/m industrial EMF in comparison with a control group. These changes pertained to the titers of beta-lysine and lysozyme and the general bactericidal potency of blood serum, determined by commonly accepted techniques. B.W.

N83-29985# Joint Publications Research Service, Arlington, Va.
EFFECT OF INDUSTRIAL FREQUENCY ELECTRIC FIELD (50 Hz) ON METABOLISM OF COPPER, IRON AND METALLOENZYMES BOUND TO THEM (EXPERIMENTAL RESEARCH)
I. I. Shvayko and I. P. Kozyarin *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 10 (JPRS-83745) 23 Jun. 1983 p 55-60 refs Transl. into ENGLISH from Gig. Sanit. (USSR), no. 1, Jan. 1983 p 89-92 (For primary document see N83-29973 18-51)
Avail: NTIS HC A04

In the search for the limiting indicators to be used in such standardization. Experiments were conducted with the purpose of studying the balance and interorgan distribution of elements playing the most important role in hemopoiesis--copper and iron, and the activity of metalloproteins bound with these metals--ceruloplasmin and transferrin. The research was conducted on white male rats distributed into four groups of 15 animals each depending on the intensity of a 50 Hz (industrial frequency) electric field. Animals in group 1 served as the control, while rats in groups 2, 3 and 4 were exposed to industrial frequency electric fields with intensities of 7, 12 and 15 kv/m respectively for 30 minutes daily over a period of 4 months. Animals to be irradiated were placed between the electrodes of a field generating unit. Fields of the required intensities were created by high voltage oil transformers. B.W.

N83-29986# Joint Publications Research Service, Arlington, Va.
USE OF MAGNETS IN MEDICAL TREATMENT **c52**
A. Aliyev *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 10 (JPRS-83745) 23 Jun. 1983 p 61-70 Transl. into ENGLISH from Vyshka (USSR), 10 Feb. 1983 p 4 (For primary document see N83-29973 18-51)
Avail: NTIS HC A04

In connection with the successes achieved in space biology and biophysics in the sixties research in this area has sharply increased. This research is concerned with a wide range of questions, including the medical use of a magnetic field, magnetohygiene, magnetopharmacology, biomagnetism and others. Clinical experimental research has established that a constant magnetic field and a low frequency alternating magnetic field possess analgesic, antiedematous and antifeb'ril action, decrease dystrophic processes, and increase blood circulation. B.W.

N83-29987# Joint Publications Research Service, Arlington, Va.
GENETIC DANGER OF NON-THERMAL INTENSITY MICRORADIO WAVES AND ITS HYGIENIC ASPECTS **c52**
M. G. Shandala, Ye. N. Antipenko, I. V. Koveshnikova, and O. I. Timchenko *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 10 (JPRS-83745) 23 Jun. 1983 p 64-70 refs Transl. into ENGLISH from Gig. Sanit. (USSR), no. 10, Oct. 1982 p 38-41 (For primary document see N83-29973 18-51)
Avail: NTIS HC A04

The aim of the present study was experimental clarification of the possibility of a modifying effect of microwave EMF's (2375 MHz) of nonthermal intensities on a number of cells with chromosomal aberrations in an integral organism of mammals.
Author

N83-30021*# Purdue Univ., Lafayette, Ind.
DEVELOPMENT OF SELECTION CRITERIA AND THEIR APPLICATION IN EVALUATION OF CELSS CANDIDATE SPECIES
J. E. Hoff, Jean M. Howe, and C. A. Mitchell *In* NASA. Ames Research Center Controlled Ecol. Life Support System Dec. 1982 p 18-20 (For primary document see N83-30016 18-54)
Avail: NTIS HC A05/MF A01 CSCL 06F

N83-30022*# Purdue Univ., Lafayette, Ind. Dept. of Horticulture.
CANDIDATE SPECIES SELECTION: CULTURAL AND PHOTOSYNTHETIC ASPECTS
Cary A. Mitchell *In* NASA. Ames Research Center Controlled Ecol. Life Support System Dec. 1982 p 21-22 (For primary document see N83-30016 18-54)
Avail: NTIS HC A05/MF A01 CSCL 06C

N83-30023*# Wisconsin Univ., Madison. Dept. of Horticulture.
CANDIDATE SPECIES SELECTION AND CONTROLLED ENVIRONMENT INJURIES
T. W. Tibbitts *In* NASA. Ames Research Center Controlled Ecol. Life Support System Dec. 1982 p 23 (For primary document see N83-30016 18-54)
Avail: NTIS HC A05/MF A01 CSCL 06C

N83-30024*# Utah State Univ., Logan. Dept. of Plant Science.
STUDIES ON MAXIMUM YIELD OF WHEAT AND OTHER SMALL GRAINS IN CONTROLLED ENVIRONMENTS
Frank B. Salisbury, Rulon S. Albrechtsen, William F. Campbell, and Wade G. Dewey *In* NASA. Ames Research Center Controlled Ecol. Life Support System Dec. 1982 p 24-25 (For primary document see N83-30016 18-54)
Avail: NTIS HC A05/MF A01 CSCL 06C

N83-30025*# California Univ., Davis. Plant Growth Lab.
SELECTION OF CROP VARIETIES FOR EFFICIENT PRODUCTION USING UREA, AMMONIA, NITRITE, AND NITRATE IN CELLS
R. C. Huffaker *In* NASA. Ames Research Center Controlled Ecol. Life Support System Dec. 1982 p 26-28 (For primary document see N83-30016 18-54)
Avail: NTIS HC A05/MF A01 CSCL 06C

N83-30026*# North Carolina State Univ., Raleigh. Dept. of Soil Science.
PLANT GROWTH IN CONTROLLED ENVIRONMENTS IN RESPONSE TO CHARACTERISTICS OF NUTRIENT SOLUTIONS
C. D. Raper, Jr. *In* NASA. Ames Research Center Controlled Ecol. Life Support System Dec. 1982 p 29-32 (For primary document see N83-30016 18-54)
Avail: NTIS HC A05/MF A01 CSCL 06C

N83-30027*# Massachusetts Inst. of Tech., Cambridge. Dept. of Chemical Engineering.
TO PRODUCE NUTRIENTS FOR PLANT GROWTH
Michael Modell, Herman Miessner, Marcus Karel, John Carden, and Stanley Lewis *In* NASA. Ames Research Center Controlled Ecol. Life Support System Dec. 1982 p 33 Prepared in cooperation with Georgia Inst. of Tech., Atlanta (For primary document see N83-30016 18-54)
Avail: NTIS HC A05/MF A01 CSCL 06C

52 AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and weightlessness.

N83-29988 Defence Research Information Centre, Orpington (England).

TREATMENT OF HYPOTHERMIA IN A SEAMAN FOLLOWING THE SHIPWRECK OF A COASTAL MOTORSHIP
A. Lowe and H. Goethe Feb. 1983 28 p refs Transl. into ENGLISH from Med. Welt (West Germany), v. 32, no. 21, 1981 p 828-835
(DRIC-T-6835; BR87061) Copyright. Avail: Issuing Activity

The accident, hypothermia, rescue and transport, treatment, temperature and therapy records analysis, parameter analysis, ECG, clinical laboratory data, drugs, neurological and physiotherapeutic treatment, and current state of health are reported. Author

N83-29989* National Aeronautics and Space Administration, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 247)
Jul. 1983 65 p
(NASA-SP-7011(247); NAS 1.21:7011(247)) Avail: NTIS HC A04 CSCL 06E

This bibliography lists 269 reports, articles and other documents introduced into the NASA scientific and technical information system in June 1983. Author

N83-29990 National Physical Lab., Teddington (England). Div. of Materials Applications.
BIOMECHANICS OF HEAD TOLERANCE CRITERIA
F. J. Lockett Apr. 1983 20 p refs
(Contract TRRL-90/1297)
(NPL-DMA(A)64; ISSN-0143-7313) Copyright. Avail: Issuing Activity

A biomechanics analysis of head impact was performed, and damage criteria were derived. It is shown that the Gadd, severity, and head injury (HIC) criteria are adequate. It is correct to express the tolerance criterion as a correlation between injury and acceleration. There is no ambiguity in deciding which point within the head (center of gravity or elsewhere) the acceleration refers to. Criteria can involve integrations over all, or only part of, the duration of the acceleration pulse. Injuries due to wave propagation are not controlled by the Gadd, severity and HIC criteria. Criteria are required to guard against these injury mechanisms and against rotation effects. Author (ESA)

N83-29991*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
NON-INVASIVE METHOD AND APPARATUS FOR MEASURING PRESSURE WITHIN A PLIABLE VESSEL Patent Application
Masashi Shimizu, inventor (to NASA) (NAS-NRC) Filed 10 Feb. 1983 14 p Sponsored by NASA
(NASA-Case-ARC-11264-2; US-Patent-Appl-SN-465370) Avail: NTIS HC A02/MF A01 CSCL 06B

A non-invasive method and apparatus is disclosed for measuring pressure within a pliable vessel such as a blood vessel. The blood vessel is clamped by means of a clamping structure having a first portion housing a pressure sensor and a second portion extending over the remote side of the blood vessel for pressing the blood vessel into engagement with the pressure sensing device. The pressure sensing device includes a flat deflectable diaphragm portion arranged to engage a portion of the blood vessel flattened against the diaphragm by means of the clamp structure. In one embodiment, the clamp structure includes first and second semicylindrical members held together by retaining rings. In a second embodiment the clamp structure is of one piece construction having a solid semicylindrical portion and a hollow semicylindrical portion with a longitudinal slot in the follow semicylindrical portion through which a slip the blood vessel. In a third embodiment, an elastic strap is employed for clamping the blood vessel against the pressure sensing device. NASA

N83-29992*# Federation of American Societies for Experimental Biology, Bethesda, Md. Life Sciences Div.
RESEARCH OPPORTUNITIES IN CARDIOVASCULAR DECONDITIONING, PHASE 1 Final Report
M. N. Levy, ed. and J. M. Talbot, ed. Washington NASA Jul. 1983 82 p refs
(Contract NASw-3616)
(NASA-CR-3707; NAS 1.26:3707) Avail: NTIS HC A05/MF A01 CSCL 06P

The deconditioning of the cardiovascular system that occurs during spaceflight, NASA's current and projected research program, and the conclusions and suggestions of the ad hoc Working Group are summarized. Author

N83-29993*# Federation of American Societies for Experimental Biology, Bethesda, Md. Life Sciences Research Office.
RESEARCH OPPORTUNITIES IN SPACE MOTION SICKNESS, PHASE 2 Final Report
J. M. Talbot Washington NASA Jul. 1983 64 p refs
(Contract NASw-3616)
(NASA-CR-3708; NAS 1.26:3708) Avail: NTIS HC A04/MF A01 CSCL 06S

Space and motion sickness, the current and projected NASA research program, and the conclusions and suggestions of the ad hoc Working Group are summarized. The frame of reference for the report is ground-based research. Author

N83-29994# Civil Aeromedical Inst., Oklahoma City, Okla. Office of Aviation Medicine.
EFFECTS OF SOME MOTION SICKNESS SUPPRESSANTS ON TRACKING PERFORMANCE DURING ANGULAR ACCELERATIONS
David J. Schroeder, William E. Collins, and Gary W. Elam Oct. 1982 21 p refs
(AD-A123839; FAA-AM-82-19) Avail: NTIS HC A02/MF A01 CSCL 06/19

The two studies reported here examined the influence of three established antimotion sickness drugs on tracking performance in static (stationary) and dynamic (angular acceleration) conditions and on visual fixation ability during motion. In Study I, 40 young men were randomly assigned in equal numbers to either a control (lactose placebo), dimenhydrinate (50 mg), promethazine hydrochloride (25 mg), or mixture (25 mg promethazine plus 10 mg d-amphetamine) group. Study 2 used 30 new subjects equally divided into control, dimenhydrinate (100 mg), and promethazine (50 mg) groups. Following practice, tests were conducted prior to 1, 2, and 4 hours after drug ingestion. The depressant drugs had little effect on static tracking, but impaired dynamic tracking performance and reduced ability to maintain visual fixation on a localizer/glide slope instrument due to increased ocular nystagmus. The mixture of promethazine and d-amphetamine produced none of these deleterious effects. GRA

N83-29995# Army Research Inst. of Environmental Medicine, Natick, Mass.
PROCEDURES FOR THE MEASUREMENT OF ACUTE MOUNTAIN SICKNESS
James B. Sampson, Allen Cymerman, Richard L. Burse, John T. Maher, and Paul B. Rock 17 Feb. 1983 34 p refs
(AD-A126280; USARIEM-M-8/83) Avail: NTIS HC A03/MF A01 CSCL 06/19

Although acute mountain sickness (AMS) has been studied for well over a century, a standard measure or index of the degree of illness for use in experimental research does not exist. This paper outlines a definition and procedures for an operational measurement of AMS using the Environmental Symptoms Questionnaire (ESQ). Fifty-eight men completed over 650 ESQs during a one to three week stay atop Pike's Peak (4300m). Factor analysis produced nine distinct symptom groups, with two factors representing AMS. The first factor contains symptoms indicative of cerebral hypoxia and is labeled AMS-C. The second reflects respiratory distress and is call AMS-R. Signal detection theory was used to establish a criterion score value for each factor. Standard deviation values were used to derive indices of sickness severity. Discussion is given to the possible relationships between the two types of AMS and the more serious conditions of cerebral and pulmonary edema. Author (GRA)

N83-29996# JAYCOR, Del Mar, Calif.
A THEORETICAL ANALYSIS OF THE OBSERVED CALCIUM ANOMALIES CONCOMITANT WITH THE INTERACTION OF LOW INTENSITY ELECTRIC FIELDS WITH CEREBRAL TISSUE
James D. Bond and Carol A. Jordan 31 Dec. 1982 67 p refs
(Contract N00014-81-C-0449)
(AD-A126284) Avail: NTIS HC A04/MF A01 CSCL 06/18

We have developed an analytical model that describes certain aspects of the displacement of divalent calcium ions, Ca(+2), from the surface of biological tissue exposed to radio frequency radiation. This model explicitly provides a means of quantifying certain ideas that have heretofore been suggested by others, but only in a qualitative sense, as providing a basis for Ca(+2) ion displacement. A detailed description of the conceptual basis as well as the analytical framework and examples of how this model can be tested are discussed in Sections 2 and 3 of this final report. A review of the scientific literature devoted to developing theoretical concepts to explain the coupling of radio frequency electromagnetic fields to biological membranes is presented as Section 4 of this report. GRA

N83-29997# Army Research Inst. of Environmental Medicine, Natick, Mass. Heat Research Div.
CHRONIC CONSUMPTION OF A LOW SODIUM DIET: HORMONAL AND PHYSIOLOGICAL EFFECTS DURING EXERCISE IN THE HEAT
Ralph Francesconi, R. W. Hubbard, and M. Mager 26 Jan. 1983 22 p refs
(DA Proj. 3M1-61102-BS-10)
(AD-A124936; M7/83) Avail: NTIS HC A02/MF A01 CSCL 06/19

To elucidate the effects of sodium deficiency on the ability to work in the heat, immature rats were fed a diet deficient in sodium for approximately 2 months. Rates of weight gain were severely affected in the Na(+) deficient rats although fluid consumption was unaffected. The low Na+ diet effected no alterations in endurance or weight loss during exercise in the heat to hyperthermic exhaustion, but final core and skin temperatures were significantly reduced in the low Na+ group and hemotocrit ratios were significantly increased. Circulating Na(+) and potassium levels were significantly increased in both groups after hyperthermic exhaustion. In the Na(+) deficient groups, plasma levels of both aldosterone and cortisol/corticosterone were significantly increased, and these increments were exacerbated following exercise to hyperthermic exhaustion. Consumption of the low Na(+) diet elicited significant increments in circulating levels of lactate and creatinine, both of which were increased further after exercise. Circulating glucose was unaffected by consumption of the sodium deficient diet but declined in this group following exercise. Urea nitrogen and lactic acid dehydrogenase were increased after exercise but unaffected by the low sodium diet. Additional experiments are planned to elucidate further the metabolic and physiologic effects of chronic ingestion of a low Na(+) diet.
Author

N83-29998# Rochester Univ., N. Y. Dept. of Medicine and Radiation Biology.
MICROWAVES AND HUMAN LEUKOCYTE FUNCTION Final Report, 10 May 1981 - 15 Nov. 1982
Norber J. Roberts, Jr., Shin-Tsu Lu, and Sol M. Michaelson Dec. 1982 16 p refs
(Contract F33615-81-K-0616; AF Proj. 7757)
(AD-A124000; SAM-TR-82-41) Avail: NTIS HC A02/MF A01 CSCL 06/18

Cell source and cellection of blood, exposure and sham-exposure to microwaves, assays of leukocyte viability, assays of DNA, RNA, and total protein synthesis, assays of interferon production, and statistical analysis are addressed. Leukocyte viability; DNA, RNA, and total protein synthesis; and interferon synthesis are discussed. Author

N83-29999# Illinois Univ., Champaign. Lab. for Cognitive Psychophysiology.
THE EVENT RELATED BRAIN POTENTIAL AS AN INDEX OF INFORMATION PROCESSING, COGNITIVE ACTIVITY, AND SKILL ACQUISITION: A PROGRAM OF BASIC RESEARCH Annual Progress Report, 1 Sep. 1981 - 30 Oct. 1982
Emanuel Donchin, Christopher Wickens, and Michael G. H. Coles Nov. 1982 159 p refs
(Contract F49620-79-C-0233; AF Proj. 2313)
(AD-A125699; AFOSR-83-0051TR; CPL82-2) Avail: NTIS HC A08/MF A01 CSCL 05/10

The materials assembled in this report represent work conducted with AFOSR support at the Cognitive Psychophysiology Laboratory during the reporting period. Articles discussed in this report follow: Cognitive Psychophysiology and Preparatory Processes A Case Study; A New Method for Off-Line Removal of Ocular Artifact; The Performance of Concurrent Tasks: A Psychophysiological Analysis of the Reciprocity of Information Processing Resources; P300 and Memory: Individual Differences in the von Restorff Effect; N200 Amplitude as a Function of Degree of Mismatch in a Word Categorization Paradigm; P300 Latency and Reaction Time from a Visual Search Task with Varying Levels of Noise and S-R Compatibility; Electrophysiology of Absolute Pitch; Information Extraction and P300 Amplitude; Operator Workload as a Function of the System State An Analysis Based upon the Event-Related Brain Potential; Pseudo-Quickening: A New Display Technique for the Control of Higher Order Systems; and An Investigation of Redundant Auditory Tracking. GRA

N83-30000# New Hampshire Univ., Durham. Vision Research Lab.
SPATIAL AND TEMPORAL VISUAL MASKING AND VISIBILITY Annual Report for FY 1982
Robert A. Smith 1 Oct. 1982 32 p refs
(Grant AF-AFOSR-0045-80; AF Proj. 2313)
(AD-A125696; AFOSR-83-0050TR; AR-1) Avail: NTIS HC A03/MF A01 CSCL 05/10

Substantial evidence supports the hypothesis that visual detection in the presence of masking noise occurs at a constant signal/noise ratio only if the subject is unfamiliar with the mask. A variety of studies of the proposed sustained/transient mechanism model have failed to find support for a dichotomous visual system, and have failed to replicate some of the classical studies in this area. Studies of hypothetical velocity tuned channels suggest the possible existence of such channels, but show that they are, at best, mixed in their tuning properties. Weisstein's Pixel Flicker technique has been found to be an artifact of an unrealistic algorithm for adding noise to a visual scene. Other temporal enhancement schemes show some promise. GRA

N83-30001# Cambridge Univ. (England). Dept. of Experimental Psychology.
COLOR VISION CONFERENCE Final Report, 15 Jun. 1982 - 15 Mar. 1983
John D. Mollon, ed. 15 Mar. 1983 12 p Conf. held in Cambridge, England Submitted for publication
(Grant N00014-82-G-0111; WR04101001; RR0420902; NR Proj. 197-075)
(AD-A125435) Avail: NTIS HC A02/MF A01 CSCL 06/16

A conference was organized that brought together 133 research scientists of diverse specialities to address a comprehensive review of the experimental and theoretical advances in color vision and to consider their application to the design of color-coding and color displays. GRA

N83-30002# Naval Submarine Medical Research Lab., Groton, Conn.
CO2 RETENTION AND ECG CHANGES IN EXERCISE DURING PROLONGED HYPERBARIC N2-O2 BREATHING Interim Report
Karl E. Schaefer, James H. Dougherty, Jr., James M. Wilson, Russel L. Frayre, and Douglas R. Knight 30 Nov. 1982 26 p refs
(AD-A125403; NSMRL-956) Avail: NTIS HC A03/MF A01 CSCL 06/19

Respiratory function (VE, VO2, VCO2, r and PACO2) was

measured in tne subjects at rest and exercise during prolonged hyperbaric chamber exposure to 2.52, 2.82, 4.03, and 7.00 atmospheres absolute (ATA). At 4.03 ATA, the ventilatory response to exercise was found depressed at 150 watts. Increased PACO2 indicated CO2 retention. At 7.00 ATA there was a slight but significant elevation of PACO2 at rest and a depression of the ventilatory response to exercise at both 50 and 125 watts associated with a marked CO2 retention. Arrhythmias were found at 4.03 and 7.00 ATA with workloads of 150 and 125 watts, respectively. At 4.03 ATA, premature atrial contractions (PAC) were noted at 150 watts in two subjects during four separate testing sessions. At 7.00 ATA, PAC's were observed at 125 watts in two subjects. One subject developed premature ventricular contractions (PVC's) during three different tests at 125 watts. Arrhythmias occurred only in those exercise tests which produced a marked CO2 retention at increased pressure. Author (GRA)

N83-30003# Naval Submarine Medical Research Lab., Groton, Conn. Biomedical Sciences Dept.
WORKSHOP ON DETECTION AND MEASUREMENT OF PULMONARY OXYGEN TOXICITY
C. J. Lambertsen, R. G. Eckenhoff, and J. W. Parker 28 Jan. 1983 38 p refs Workshop held at Groton, Conn., 27-28 Oct. 1981
(Contract N00014-75-C-0348)
(AD-A125821; NSMRL-980) Avail: NTIS HC A03/MF A01 CSCL 06/19

As part of this laboratory's continuing research in shallow air saturation diving in support of the Navy's submarine rescue capability, several military and civilian scientists met for two days to discuss pulmonary oxygen toxicity and the various methods of its detection and quantification. The pathogenesis, biochemistry, and characteristics of the disease in both animals and humans were reviewed and discussed at length. Methods ranging from conventional spirometry to nuclear magnetic resonance to expired gas chemoluminescence were presented. Specific recommendations and limitations of the techniques were obtained concerning the application of these techniques to humans in a hyperbaric environment. The need for additional data concerning the progression and recovery from pulmonary oxygen toxicity in both man and animals was apparent during this workshop. Author (GRA)

N83-30004# Army Research Inst. of Environmental Medicine, Natick, Mass. Heat Research Div.
SURVEY AND ANALYSIS OF THE HEAT CASUALTY PREVENTION EXPERIMENT FOR RESPHIBLEX 1-81, OPERATION 'LANCER EAGLE', 43D, MAU
Roger W. Hubbard, William Matthew, and Dennis Wright 12 Jul. 1982 28 p
(AD-A125847; USARIEM-T5/82) Avail: NTIS HC A03/MF A01 CSCL 06/19

This report describes the results of a heat casualty prevention experiment conducted in cooperation with reserve elements of the 43D Marine Amphibious Unit, during a training exercise, Operation Lancer Eagle, which took place at Little Creek, VA and Camp Lejeune, NC in July, 1981. The purpose of the experiment was to evaluate, under field conditions, the effectiveness of a revised approach t the prevention of heat casualties. Four companies of Marines were selected to participate. Two companies (220 men) served as 'controls' and received whatever hot weather training had been provided through routine channels. The two 'test' companies (306 men) received a thorough briefing on the elements of the Provisional Heat Doctrine and were instructed in the proper use of the Botsball to obtain accurate measurements of local heat stress levels. The 'test' companies were also given a reference card which provided a specific schedule for water intake and work/rest cycles depending on the measured heat stress. GRA

N83-30005# Oak Ridge National Lab., Tenn. Information Div.
TOXICOLOGY INFORMATION RESPONSE CENTER: A TEN-YEAR PERSPECTIVE
C. Oen, S. G. Winslow, and H. B. Gerstner 1982 13 p refs Presented at the Am. Soc. for Inform. Sci. Mid-Year Meeting, Knoxville, Tenn., 13 Jun. 1982
(Contract W-7405-eng-26)
(DE82-017430; CONF-820624-3) Avail: NTIS HC A02/MF A01

The Toxicology Information Response Center (TIRC) recently completed its first decade of work. The founding of the center coincided with a growing national concern about chemicals in the environment and their potential delerious effects upon human populations. This paper discusses the concept, design, and the evolution of TIRC's produces and services as they relate to trends in the user community, the increase in toxicology-related literature, and regulatory and media interest in specific areas of toxicology. Advances in information science and technology are discussed as to their potential positive impact on the future of TIRC and its continuing growth. DOE

N83-30006# Brookhaven National Lab., Upton, N. Y.
FACILITY FOR IN-VIVO MEASUREMENT OF LITHIUM
D. Vartsky, L. Wielopolski, K. J. Ellis, and S. H. Cohn 1982 5 p refs Presented at the Workshop on Uses of Nucl. Anal. Methods in Metal Toxicology, Upton, N.Y., 11 Oct. 1982
(DE83-007388; BNL-32266; CONF-8210106-3) Avail: NTIS HC A02/MF A01

A method for in-vivo measurement of Li levels in the human brain and other organs of interest such as the kideny is presented. DOE

N83-30007# Institute of Applied Physiology and Medicine, Seattle, Wash.
ULTRASONIC IMAGING DEVELOPMENT Final Report, Jun. 1978 - Sep. 1980
John M. Reid 11 Jun. 1982 34 p refs
(Contract N01-HV-2926-2)
(PB83-155994; NIH-N01-HV-2926-2) Avail: NTIS HC A03/MF A01 CSCL 06B

This investiation has been directed toward producing a Doppler arterial imaging system for the detection and quantitation of atherosclerosis that is faster to use and more certain in the interpretation than the present system. Work has been accomplished in three major tasks: (1) The development of an automatic line scanning system so the data can be collected rapidly and to allow use of multiple plane images for more certain diagnosis; (2) the construction of a new pulse-Doppler system for producing biplane images of the carotid bifurcation so that the missing depth coordinate can be assessed for utility. This system has been constructed and tested, and an image has been obtained to illustrate the format; (3) the development of a physiological interpretive display for presenting data presently obtained by the ear-brain combination of the observer on the screen in the form of a color map. GRA

N83-29986# Joint Publications Research Service, Arlington, Va.
USE OF MAGNETS IN MEDICAL TREATMENT
A. Aliyev *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 10 (JPRS-83745) 23 Jun. 1983 p 61-70 Transl. into ENGLISH from Vyshka (USSR), 10 Feb. 1983 p 4 (For primary document see N83-29973 18-51)
Avail: NTIS HC A04

N83-29987# Joint Publications Research Service, Arlington, Va.
GENETIC DANGER OF NON-THERMAL INTENSITY MICRO-RADIO WAVES AND ITS HYGIENIC ASPECTS
M. G. Shandala, Ye. N. Antipenko, I. V. Koveshnikova, and O. I. Timchenko *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 10 (JPRS-83745) 23 Jun. 1983 p 64-70 refs Transl. into ENGLISH from Gig. Sanit. (USSR), no. 10, Oct. 1982 p 38-41 (For primary document see N83-29973 18-51)
Avail: NTIS HC A04

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N83-30008# North Research, Inc., Anchorage, Alaska. Alaskan Aviation Safety Foundation.
THE BUSH PILOT SYNDROME: A CRITICAL INCIDENT ANALYSIS
Michael K. Mitchell Apr. 1983 13 p refs
Avail: NTIS HC A02/MF A01

The National Transportation Safety Board concluded in a 1980 study that the bush pilot syndrome was a major factor contributing to a non-fatal air taxi accident rate four times higher and a fatal rate more than double the rest of the United States. During 1981-1982, the Alaskan Aviation Safety Foundation completed and published a study titled Definition of Alaskan Aviation Training Requirements. The researchers used Flannigan's critical incident technique. The respondents reported that strict management supervision was the key to controlling the bush pilot syndrome. In addition, observations by the researchers revealed that air taxi operators who hired pilots using a careful screening process, provided thorough training, and remunerated pilots with a rewarding salary and benefit package seemed to have less turnover and fewer accidents. Author

N83-30009# Xerox Palo Alto Research Center, Calif. Cognitive and Instructional Sciences Group.
COMPETITIVE ARGUMENTATION IN COMPUTATIONAL THEORIES AT COGNITION Interim Report
Kurt VanLehn, John Seely Brown, and James Greeno Dec. 1982 41 p refs
(Contract N00014-82-C-0067)
(AD-A125577; CIS-14; P83-00030) Avail: NTIS HC A03/MF A01 CSCL 05/10

Computer science has given psychology a new way of expressing models of cognition that is much more detailed and precise than its predecessors. But unfortunately, the increased detail and precision in stating models has not been accompanied by correspondingly detailed and precise arguments analyzing and supporting them. Consequently, the new, richly detailed models of cognitive science often fail to meet the traditional criteria of scientific theories. This report discusses what kinds of tools are available or can be fashioned that will help cognitive scientists build computational theories of cognition that will meet some widely accepted standards that have so far proved difficult for such theories to meet. The prime tool of this discussion, actually a class of tools, is the competitive argument. Author (GRA)

N83-30010# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A CLINICAL PSYCHOLOGICAL STUDY OF INVERTED VISUAL FIELD BY INVERSING PRISMS
Masahiro Fujiwara, Takehisa Nakao, Hieaki Ninomiya, and Terutika Ikeda 10 Feb. 1983 22 p refs Transl. into ENGLISH from Kyushu Neuro-Psychiatry (Japan), v. 26, no. 3-4, Dec. 1980 p 384-394
(AD-A126220; FTD-ID(RS)T-1861-82) Avail: NTIS HC A02/MF A01 CSCL 06/16

The process of adaptation was studied, using inversing prisms. There was no completely upright vision of the external world, was any upright vision subject to the all or none law. Results suggest that perceptive adaptation is based on integration of visual and somatosensory coordination. Author

N83-30011# Bernard Baruch Coll., New York. Lab. for Psychophysiology.
BRAIN RESPONSES AND INFORMATION PROCESSING 3: HEMISPHERIC ASYMMETRY IN EVENT RELATED POTENTIALS AND PERFORMANCE DURING DISCRIMINATION OF LINE ORIENTATION AND VELOCITY OF MOTION Annual Report, 1 Oct. 1981 - 30 Sep. 1982
John I. Andreassi and N. Mauro Juszczak 30 Nov. 1982 73 p refs
(Contract F49620-80-C-0013; AF Proj. 2313)
(AD-A125681; AFOSR-83-0062TR; AR-3) Avail: NTIS HC A04/MF A01 CSCL 05/10

The research completed over the last 12 months has included studies concerned with evoked brain potentials and performance measures during perceptual discriminations. Experiment 1 examined the event related potential (ERP) during discriminations of line orientation in three visual fields. The main finding concerning discrimination performance confirmed that right hemisphere discriminations (LVF) would be better than left, (RVF) but only for males. Another important finding was that, while discrimination task invoked an expected P3 response, significantly larger P3 amplitudes were associated with the line orientation stimulus (i.e., 55 deg line) requiring a YES response. A follow-up study was briefly described in which subjects will be required to say 'YES' to the 50 deg line and 'NO' to the 55 deg line, with the expectation that the P3 amplitude advantage would switch to the 50 deg line. Experiment 2 concerned the discrimination of motion velocities and the relation of this process to ERPs. Performance data indicated that left hemisphere discriminations (RVF) were superior to right (LVF). A separate analysis of male-female performance indicated that females contributed to this effect more than males. Finally, laterality effects were suggested for the P3 component since right hemisphere derived amplitudes for P3 were larger with the faster velocity. GRA

N83-30012# Yale Univ., New Haven, Conn. Dept. of Psychology.
COMPONENTS OF INDIVIDUAL DIFFERENCES IN HUMAN INTELLIGENCE Final Report, 1 Oct. 1977 - 30 Sep. 1982
Robert J. Sternberg Feb. 1983 102 p refs Submitted for publication
(Contract N00014-78-C-0025; RR04200401; NR Proj. 150-412)
(AD-A125633; FR-1-83) Avail: NTIS HC A96/MF A01 CSCL 05/10

The report is divided into three main sections. The first briefly reviews alternative approaches to understanding the nature of intelligence. The second provides the proposed componential metatheory. The third and main section describes various aspects of the componential theory and tests of this theory. This last section covers inductive and deductive reasoning. The report closes with some conclusions and suggested directions for future research. GRA

N83-30013# Maryland Univ., College Park. Lab. for Computer Vision.
UNDERSTANDING OBJECTS, FEATURES AND BACKGROUNDS Final Report, 1 May 1980 - 31 Dec. 1982
Azriel Rosenfeld and Larry S. Davis Jan. 1983 34 p refs
(Contract DAAG53-76-C-0138; DARPA Order 3206)
(AD-A125514) Avail: NTIS HC A03/MF A01 CSCL 05/10

Research on Understanding Objects, Features, and Backgrounds, carried out during the period May 1980 December 1982, is summarized under the following headings: (a) Object segmentation and recognition; (b) Feature extraction and background analysis; (c) Multi-resolution image analysis; (d) Time-varying imagery analysis. Further details can be found in the 32 technical reports that were issued on the project; a list of these reports, together with their abstracts, is provided. GRA

N83-30014# Pennsylvania State Univ., University Park. Dept. of Psychology.
THE MEASUREMENT OF MOTIVATIONAL STYLE: A FORMAT MODIFICATION
Frank J. Landy and Wendy S. Becker Mar. 1983 27 p refs
(Contract N00014-81-K-0197; NR Proj. 170-926)
(AD-A125756; REPT-82-2) Avail: NTIS HC A03/MF A01 CSCL 05/10

The measurement of motivational style is extended within the framework of Adaptive Motivation Theory. The development of a revised measure using seven paragraph descriptions of motivational

style is discussed. Response patterns for the seven styles are examined according to specific variables, such as age, gender, and occupation. The revised format is described as a more sensitive measure of motivational style, than an earlier version.
Author (GRA)

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N83-30015 National Physical Lab., Teddington (England). Div. of Materials Applications.
AN ENGINEERING ASSESSMENT OF HEAD TOLERANCE CRITERIA
F. J. Lockett Apr. 1983 17 p refs
(Contract TRRL-90/1297)
(NPL-DMA(A)63; ISSN-0143-7313) Copyright. Avail: Issuing Activity

Criteria for the specification of human tolerance to conditions which produce brain damage are assessed. Evaluation of their suitability for use in designing protective systems indicates that they are appropriate and that defects are of little practical importance. Biomechanical analysis shows that the Wayne State curve and the Gadd, severity, and head injury criteria are sound. The role of criteria based on jerk is identified, and it is demonstrated that there is a tractable route to a criterion for tolerance to angular acceleration. Author (ESA)

N83-30016*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
CONTROLLED ECOLOGICAL LIFE SUPPORT SYSTEM. FIRST PRINCIPAL INVESTIGATORS MEETING
Berrien Moore, III, ed. (New Hampshire Univ., Durham), Robert A. Wharton, Jr., ed. (New Hampshire Univ., Durham), and Robert D. MacElroy, ed. Dec. 1982 90 p refs Meeting held in Durham, N.H., 3-6 May 1981
(Contract NCC2-27)
(NASA-CP-2247; A-9055; NAS 1.55:2247; CELSS-19) Avail: NTIS HC A05/MF A01 CSCL 06C

Control problems in autonomous life support systems, CELSS candidate species, maximum grain yield, plant growth, waste management, air pollution, and mineral separation are discussed. For individual titles, see N83-30017 through N83-30033.

N83-30017*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
CURRENT CONCEPTS OF THE CELSS PROGRAM
Robert D. MacElroy *In its* Controlled Ecol. Life Support System Dec. 1982 p 1-4 (For primary document see N83-30016 18-54)
Avail: NTIS HC A05/MF A01 CSCL 06K

The intent of the National Aeronautics and Space Administration in supporting the Controlled Environment Life Support System (CELSS) program is to establish the technological basis for the development of life support systems that are relatively independent of resupply. Such systems, it is anticipated, will be needed in the future to support manned space flight involving long duration missions and large numbers of people. The establishment of a resupply-independent life support system requires that all or most of the material in such a system be retained and recycled. In fact, leakage of gases into space, or into atmospheres of significantly lower pressure than that found inside of the system, is inevitable. Technical advances in sealing capabilities may reduce losses in the future, but no seals will ever be perfectly impervious to common atmospheric gases. Thus, a CELSS is envisioned to be a recycling system that will need to be resupplied with gases from time to time. Author

N83-30018*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
THE CELSS PROGRAM: AN OVERVIEW OF ITS STRUCTURE AND USE OF COMPUTER MODELLING
M. M. Averner and Robert D. MacElroy *In its* Controlled Ecol. Life Support System Dec. 1982 p 5-8 (For primary document see N83-30016 18-54)
Avail: NTIS HC A05/MF A01 CSCL 06K

The study of the behavior of conceptualized, closed, regenerative life support systems by computer modelling is proposed.
Author

N83-30019*# California Univ., Berkeley. Dept. of Mechanical Engineering.
CELSS SYSTEM CONTROL OVERVIEW
D. M. Auslander *In* NASA. Ames Research Center Controlled Ecol. Life Support System Dec. 1982 p 9-11 (For primary document see N83-30016 18-54)
Avail: NTIS HC A05/MF A01 CSCL 06K

A CELSS presents unique control problems at all levels. The question of how much control is necessary (as opposed to just useful) is addressed. On the largest scale, that of overall system control, this reduces to the question, "Is a CELSS that has been designed for steady-state balance in all its flows, with the addition of reasonable amounts of buffering, stable in the face of perturbations from that operating point?" That is, if some inadvertent perturbation occurs (temporary shutdown of some component, for example), will the system return to its original operating point without the imposition of a global control scheme? If the system is stable in that sense, any kind of large-scale control scheme will be useful for optimizing the system, but will not be necessary.
Author

N83-30020*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
CONTROL PROBLEMS IN AUTONOMOUS LIFE SUPPORT SYSTEMS
Silvano Colombano *In its* Controlled Ecol. Life Support System Dec. 1982 p 12-17 refs Sponsored in part by NAS-NRC (For primary document see N83-30016 18-54)
Avail: NTIS HC A05/MF A01 CSCL 06K

The problem of constructing life support systems which require little or no input of matter (food and gases) for long, or even indefinite, periods of time is addressed. Natural control in ecosystems, a control theory for ecosystems, and an approach to the design of an ALSS are addressed. Author

N83-30021*# Purdue Univ., Lafayette, Ind.
DEVELOPMENT OF SELECTION CRITERIA AND THEIR APPLICATION IN EVALUATION OF CELSS CANDIDATE SPECIES c51
J. E. Hoff, Jean M. Howe, and C. A. Mitchell *In* NASA. Ames Research Center Controlled Ecol. Life Support System Dec. 1982 p 18-20 (For primary document see N83-30016 18-54)
Avail: NTIS HC A05/MF A01 CSCL 06F

A total of 21 criteria were considered; nine of them fall into the realm of human nutrition and convenience (the 'use' criteria), and the remaining 12 are predominantly cultural considerations. Five criteria were considered to be of great importance in the selection of plant species and were given double eight relative to the remaining criteria. 'Use' criteria include the following: energy concentration, nutritional composition, palatability, serving size and frequency, processing requirements, use flexibility, toxicity, and human experience. 'Cultural' criteria include the following: proportion of edible biomass, yield of edible plant biomass, continuous vs. determinate harvestability, growth habit and morphology, environmental tolerance, photoperiodic and temperature requirements, symbiotic requirements and restrictions, carbon dioxide-light intensity response, suitability for soilless culture, disease resistance, familarity with species, and pollination and propagation. A total of 115 species were evaluated and scored according to suitability for a CELSS. Author

N83-30022*# Purdue Univ., Lafayette, Ind. Dept. of Horticulture.

CANDIDATE SPECIES SELECTION: CULTURAL AND PHOTOSYNTHETIC ASPECTS **c51**

Cary A. Mitchell *In* NASA. Ames Research Center Controlled Ecol. Life Support System Dec. 1982 p 21-22 (For primary document see N83-30016 18-54)

Avail: NTIS HC A05/MF A01 CSCL 06C

Cultural information is provided for a data base that will be used to select candidate crop species for a controlled ecological life support system (CELSS). Lists of food crops which will satisfy most nutritional requirements of humans and also fit within the scope of cultural restrictions that logically would apply to a closed, regenerating system were generated. Cultural and environmental conditions that will allow the most rapid production of edible biomass from candidate species in the shortest possible time are identified. Cultivars which are most productive in terms of edible biomass production by (CE) conditions, and which respond to the ever-closed approach to optimization realized by each shortened production cycle are selected. The experimental approach with lettuce was to grow the crop hydroponically in a growth chamber and to manipulate such variables as light level and duration, day/night temperature, and nutrient form and level in the solution culture. Author

N83-30023*# Wisconsin Univ., Madison. Dept. of Horticulture.

CANDIDATE SPECIES SELECTION AND CONTROLLED ENVIRONMENT INJURIES **c51**

T. W. Tibbitts *In* NASA. Ames Research Center Controlled Ecol. Life Support System Dec. 1982 p 23 (For primary document see N83-30016 18-54)

Avail: NTIS HC A05/MF A01 CSCL 06C

Research was undertaken to attempt to identify the causal agents for intumescences that develop on many different species of plants in controlled environments. Concentration and filtration procedures were not successful in identifying any particular compounds. The injury was found to develop, even though the atmosphere for the plants is filtered through activated charcoal, potassium permanganate, or is subjected to catalytic combustion at 450 C. Thus, the causal agent is apparently either an oxidized compound or specific element, or the result of some unrecognized variation in physical conditions around the plants. The research has demonstrated that the injury is controlled to a significant extent by temperature. Growing temperatures of 20 degrees and 25 degrees C resulted in serious injury on plants, but temperatures of 30 C resulted in very little injury. Author

N83-30024*# Utah State Univ., Logan. Dept. of Plant Science.

STUDIES ON MAXIMUM YIELD OF WHEAT AND OTHER SMALL GRAINS IN CONTROLLED ENVIRONMENTS **c51**

Frank B. Salisbury, Rulon S. Albrechtsen, William F. Campbell, and Wade G. Dewey *In* NASA. Ames Research Center Controlled Ecol. Life Support System Dec. 1982 p 24-25 (For primary document see N83-30016 18-54)

Avail: NTIS HC A05/MF A01 CSCL 06C

Maximum yield of wheat and perhaps other small grains under controlled environmental conditions; cultivars, photosynthesis, nutrient levels, and humidity and plant water potential; promoting grain maturation; cross gradient chamber design; and single celled clonal multiplication of wheat plants are outlined. Author

N83-30025*# California Univ., Davis. Plant Growth Lab.

SELECTION OF CROP VARIETIES FOR EFFICIENT PRODUCTION USING UREA, AMMONIA, NITRITE, AND NITRATE IN CELLS **c51**

R. C. Huffaker *In* NASA. Ames Research Center Controlled Ecol. Life Support System Dec. 1982 p 26-28 (For primary document see N83-30016 18-54)

Avail: NTIS HC A05/MF A01 CSCL 06C

The presence of NO2(-) in the external solution increased the overall efficiency of the mixed N sources by cereal leaves. The NH4(+) in the substrate solution decreased the efficiency of NO3(-) reduction, while NO3(-) in the substrate solution increased the efficiency of NH4(+) assimilation. Author

N83-30026*# North Carolina State Univ., Raleigh. Dept. of Soil Science.

PLANT GROWTH IN CONTROLLED ENVIRONMENTS IN RESPONSE TO CHARACTERISTICS OF NUTRIENT SOLUTIONS **c51**

C. D. Raper, Jr. *In* NASA. Ames Research Center Controlled Ecol. Life Support System Dec. 1982 p 29-32 (For primary document see N83-30016 18-54)

Avail: NTIS HC A05/MF A01 CSCL 06C

Emphasis was given to environmental factors that alter the flux of carbohydrate from the shoot to the root system to support the absorption of nitrogen and the subsequent interaction between nitrogen uptake and whole plant growth. Only the nitrate form of nitrogen was utilized in order to establish base line responses for evaluation of future studies utilizing both ammonium and nitrate. Author

N83-30027*# Massachusetts Inst. of Tech., Cambridge. Dept. of Chemical Engineering.

TO PRODUCE NUTRIENTS FOR PLANT GROWTH **c51**

Michael Modell, Herman Miessner, Marcus Karel, John Carden, and Stanley Lewis *In* NASA. Ames Research Center Controlled Ecol. Life Support System Dec. 1982 p 33 Prepared in cooperation with Georgia Inst. of Tech., Atlanta (For primary document see N83-30016 18-54)

Avail: NTIS HC A05/MF A01 CSCL 06C

Homogeneous samples of freeze dried human feces and urine were prepared to assure comparability of results among various CELSS waste treatment research groups. A model of food processing wastes within a PCELSS was developed, and an initial batch of waste was prepared. An automated gas chromatographic system to analyze oxidizer effluents was designed and is operational. A state of the art quantitative elemental analysis capability, built around inductively coupled plasma emission spectroscopy and atomic absorption spectroscopy using electrothermal atomization, was demonstrated. A continuous flow wet oxidation system was constructed and is now operational. Potentially useful salt separation phenomena was observed. Author

N83-30028*# Massachusetts Inst. of Tech., Cambridge. Dept. of Nutrition and Food Science.

FOOD SYSTEMS FOR PCELSS

Marcus Karel *In* NASA. Ames Research Center Controlled Ecol. Life Support System Dec. 1982 p 34-37 (For primary document see N83-30016 18-54)

Avail: NTIS HC A05/MF A01 CSCL 06H

Developing acceptable and reliable engineered foods, adapting present technology and food science to expected space conditions, and food conversion operations are summarized. Author

N83-30029*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

GENERIC WASTE MANAGEMENT REQUIREMENTS FOR A CONTROLLED ECOLOGICAL LIFE SUPPORT SYSTEM (CELSS)

T. Hoshizaki and B. D. Hansen, III *In* NASA. Ames Research Center Controlled Ecol. Life Support System Dec. 1982 p 38-50 refs (For primary document see N83-30016 18-54)

Avail: NTIS HC A05/MF A01 CSCL 06K

Sources of waste, general requirements for plant growth, plant culturing systems, output requirements to match candidate plants, and integration of subsystems are addressed. Author

N83-30030*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

WET OXIDATION AS A WASTE TREATMENT METHOD IN CLOSED SYSTEMS

B. L. Onisko and T. Wydeven *In its* Controlled Ecol. Life Support System Dec. 1982 p 51-53 refs (For primary document see N83-30016 18-54)

Avail: NTIS HC A05/MF A01 CSCL 06K

The chemistry of the wet oxidation process was investigated in relation to production of plant nutrients from plant and human

waste materials as required for a closed life support system. Hydroponically grown lettuce plants were used as a model plant waste, and oxygen gas was used as an oxidant. Organic nitrogen content was decreased 88-100%, depending on feed material. Production of ammonia and nitrogen gas accounted for all of the observed decrease in organic nitrogen content. No nitrous oxide (N2O) was detected. The implications of these results for closed life support systems are discussed. Author

N83-30031*# Georgia Inst. of Tech., Atlanta. School of Nuclear Engineering.
SOME ISSUES IN COMPARABILITY OF RESULTS AND ANALYTICAL METHODOLOGY IN CELSS WASTE PROCESSING RESEARCH
John Carden *In* NASA. Ames Research Center Controlled Ecol. Life Support System Dec. 1982 p 54-56 ref (For primary document see N83-30016 18-54)
Avail: NTIS HC A05/MF A01 CSCL 06K

Standard waste materials including human wastes, food preparation and processing waste and hydroponically grown wheat were provided to CELSS researchers. Author

N83-30032*# Texas A&M Univ., College Station. Dept. of Plant Sciences.
AIR POLLUTANT PRODUCTION BY ALGAL CELL CULTURES **c45**
F. Fong and E. A. Funkhouser *In* NASA. Ames Research Center Controlled Ecol. Life Support System Dec. 1982 p 57-59 refs (For primary document see N83-30016 18-54)
Avail: NTIS HC A05/MF A01 CSCL 13B

Euglena gracilis and Chlorella vulgaris cultures and toxic gas identification are discussed. Author

N83-30033*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
MINERAL SEPARATION IN A CELSS BY ION-EXCHANGE CHROMATOGRAPHY **c25**
E. Vernon Ballou, LeRoy A. Spitze, Frankie W. Wong, Theodore Wydeven, and Catherine C. Johnson *In its* Controlled Ecol. Life Support System Dec. 1982 p 60-69 refs Prepared in cooperation with San Jose State Univ., Calif. (For primary document see N83-30016 18-54)
Avail: NTIS HC A05/MF A01 CSCL 07D

Operational parameters pertinent to ion exchange chromatography separation were identified. The experiments were performed with 9 mm diameter ion exchange columns and conventional column accessories. The cation separation beds were packed with AG 50W-X2 strong acid cation exchange resin in H(+) form and 200-400 dry mesh particle size. The stripper beds used in some experiments were packed with AG 1-XB strong base cation exchange resin in OH(-) form and 200-400 dry mesh particle size. Author

N83-30034*# Rockwell International Corp., Downey, Calif. Space Transportation and Systems Group.
TELEOPERATOR MANEUVERING SYSTEM (TMS) BENEFITS ASSESSMENT STUDY. VOLUME 1: EXECUTIVE SUMMARY Final Report
Apr. 1983 42 p 2 Vol.
(Contract NAS8-34888)
(NASA-CR-170795; NAS 1.26:170795) Avail: NTIS HC A03/MF A01 CSCL 05H

Teleoperator Maneuvering System (TMS) versus integral spacecraft propulsion, spacecraft maintenance, cost benefits, launch prices, integral propulsion length penalties, remote maintenance versus EVA, potential weight reduction benefits, basing mode, mission models and payload requirements, and program profitability are discussed. Author

N83-30035*# Rockwell International Corp., Downey, Calif. Space Transportation and Systems Group.
TELEOPERATOR MANEUVERING SYSTEM BENEFITS ASSESSMENT, VOLUME 2 Final Report
Apr. 1983 262 p 2 Vol.
(Contract NAS8-34888)
(NASA-CR-170796; NAS 1.26:170796) Avail: NTIS HC A12/MF A01 CSCL 05H

Mission models and payload requirements, systems integration requirements, costing analysis, and Teleoperator Maneuvering System benefits analysis are presented. Author

N83-30036# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
DISPLAY-CONTROL COMPATIBILITY IN 3-D DISPLAYS. 2: EFFECTS OF CUE SYMMETRY
A. W. F. Huggins and David J. Getty 15 Nov. 1982 67 p refs
(Contract N00014-80-C-0750; RR0420901)
(AD-A125806; BBN-5101) Avail: NTIS HC A04/MF A01 CSCL 09/2

This report describes the second set of four experiments in a series of studies on display-control compatibility issues in a true volumetric display called SpaceGraph. As in the initial set of experiments, we measured the speed and accuracy of simple control decisions when the displayed object was presented in orientations rotated away from congruence with the control orientation. Reaction times were measured for identifying the marked face of a static cube, presented with SpaceGraph, as a function of how much the cube image was rotated away from congruence with fixed physical cube on which the observer responded, using orientation cues with various symmetries. GRA

N83-30037# Battelle Columbus Labs., Ohio. Digital Systems and Technology Sect.
GUIDANCE AND ACTUATION TECHNIQUES FOR AN ADAPTIVELY CONTROLLED VEHICLE Final Report, 20 Jan. 1982 - 21 Mar. 1983
Mark R. Patterson, John J. Reidy, and Barry J. Brownstein 21 Mar. 1983 128 p refs
(Contract MDA903-82-C-0149; DARPA Order 4385)
(AD-A126296) Avail: NTIS HC A07/MF A01 CSCL 13/6

This technical report describes the work done to support the overall DARPA Adaptive Suspension Vehicle program. The project consisted of two major tasks: vehicle guidance and actuation techniques. The objective of the first task was to derive a method for enabling an adaptive-suspension vehicle to traverse rough terrain. The second task was concerned with actuation techniques for the legs on the vehicle, specifically an in-depth analysis, design, and demonstration of the vehicle foot-lift hydraulic circuit. This report describes the development of the vehicle guidance algorithms and the foot-lift hydraulic circuit design. GRA

N83-30038# Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario).
EVALUATION OF HIGH PERFORMANCE AIRCREW HELMETS AND OXYGEN MASKS
J. C. Lazowski and R. D. Michas Oct. 1982 50 p refs
(AD-A126036; DCIEM-82-R-54) Avail: NTIS HC A03/MF A01 CSCL 06/11

The requirement for a new oxygen mask and helmet for use by Canadian Forces (CF) aircrew in the air combat maneuvering (ACM) role was indicated in 1978. Initial studies were conducted to identify shortcomings of the current assembly and to allow aircrew to rank design characteristics. Four helmet and four oxygen mask types were ultimately selected for comprehensive evaluation. A flight trial involving 48 aircrew flying primarily CF-5 and CF-104 aircraft was conducted at CFB Cold Lake in order to determine aircrew preferences for overall and specific designs, including the preference for single or dual visor. Maintenance implications of all test equipment were also evaluated. Equipment properties were determined in laboratory studies conducted primarily at DCIEM. It is concluded that the best assembly for aircrew of CF ACM aircraft is an extended PRK 37P helmet shell with thermal plastic liner, integrated chin/nape strap, cutaway PRU 36P (dual) visor and modified type W oxygen mask. However, deficiencies related to the visor weight, center of gravity and profile should be resolved. Author (GRA)

N83-30039# Naval Ocean Systems Center, San Diego, Calif. Ocean Systems Div.
VOICE CONTROL OF AN UNMANNED SUBMERSIBLE
R. Nishijo 13 Jan. 1983 20 p
(AD-A125523; NOSC/TD-560) Avail: NTIS HC A02/MF A01 CSCL 13/10

The advantages of voice control of the movement of an unmanned, remotely controlled submersible and the feasibility of such a system are discussed. Application of voice control to the Fiber Optic Controlled Underwater Stereo (FOCUS) vehicle is described and an associated computer program listing presented. Author (GRA)

N83-30040# Air Force Occupational and Environmental Health Lab., Brooks AFB, Tex. Industrial Hygiene Branch.
PROPELLANT HANDLER'S ENSEMBLE IN-SUIT NOISE MEASUREMENTS Final Report
Carolyn M. Jones Jan. 1983 17 p
(AD-A125507; OEHL-83-072EH003ANA) Avail: NTIS HC A02/MF A01 CSCL 06/17

The USAF OEHL requested by HQ Space Division (AFSC) to measure octaveband noise levels inside the new propellant handler's ensemble (PHE) for use by the Space Shuttle Activation Task Force (SATAF) at Vandenberg AFB CA. The noise levels were necessary to determine if the PHE meets the requirements of paragraph 3.1.3.6.3 of the suit specification (79K20409) and to assess the potential for possible interferences with either internal or external voice transmissions. The PHE met the specification levels in several but not all operating categories. Speech interference levels were also dependent on the operating category. Author (GRA)

55 PLANETARY BIOLOGY

Includes exobiology; and extraterrestrial life.

N83-30041*# National Aeronautics and Space Administration, Washington, D. C.
PUBLICATIONS OF THE EXOBIOLOGY PROGRAM FOR 1982. A SPECIAL BIBLIOGRAPHY
Linda G. Pleasant, comp. and Donald L. DeVincenzi, comp. Jul. 1983 40 p Prepared in cooperation with George Washington Univ., Washington, D.C.
(NASA-TM-85837; NAS 1.15:85837) Avail: NTIS HC A03/MF A01 CSCL 06C

Chemical evolution, organic geochemistry, origin and evalution of life, planetary environments, life in the universe, search for extraterrestrial intelligence, and planetary protection are discussed. Author

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

No abstracts in this category.

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

N83-30042*# National Aeronautics and Space Administration, Washington, D. C.
DATA HIGHWAY TERMINAL CONTROLLER
T. Yoshimoto May 1983 9 p Transl. into ENGLISH from Japanese Kokai Patent, no. 56-40944, 17 Apr. 1981 p 225-228 In ENGLISH and JAPANESE Transl. by Kanner (Leo) Associates), Redwood City, Calif. Original doc prep. by Tokyo Shibaura Electric Co. Ltd. (Contract NASw-3541)
(NASA-TM-77241; NAS 1.15:77241) Avail: NTIS HC A02/MF A01 CSCL 09B

A data highway terminal controller with transmission controllers assigned to each processor in a set of multiple processors is described. Shared-use terminals are loop connected to the processors via the controllers. Author

N83-30043# Maryland Univ., College Park. Dept. of Computer Science.
INTERNATIONAL WORKSHOP ON HIGH-LEVEL LANGUAGE COMPUTER ARCHITECTURE Final Report, 1 Jun. 1982 - 31 May 1983
Yaohan Chu May 1983 26 p Workshop held at Fort Lauderdale, Fla.
(Grant N00014-82-G-0103)
(AD-A126223) Avail: NTIS HC A03/MF A01 CSCL 05/2

Two computers were exhibited at the Workshop. The Lilith Modula-2 computer developed at Swiss Federal Institute of Technology and fabricated by Modula Research Institute of U.S.A. The other is the IBM Personal computer. Document lists the names of the participants at this workshop. GRA

N83-30044# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
DELAYED BINDING IN PQCC GENERATED COMPILERS Interim Report
William A. Wulf and K. V. Nori 4 Oct. 1982 44 p refs
(Contract F33615-81-K-1539; ARPA Order 3597)
(AD-A125935; CMU-CS-82-138) Avail: NTIS HC A03/MF A01 CSCL 09/2

The authors discuss issues concerning code generation in the context of the Production Quality Compiler Compiler (PQCC) project. Several important activities in code generation are cyclically interdependent. The task of structuring an efficient production quality code generator is therefore a challenging one. This paper reports on some uses of the principle of delayed binding in target program synthesis by PQCC generated compilers. Through the use of this principle, we have designed a sequence of phases that efficiently implement an optimizing code generator. Specifically, this paper is concerned with issues in the discovery of assignment sequences, the identification of temporaries and the utilization of implicit computations in target machines. As these phases are considered in the light of a Compiler-Compiler, we describe their parameterization with respect to source languages and target machines. Author (GRA)

N83-30045# National Bureau of Standards, Washington, D.C. Inst. for Computer Sciences and Technology.
FEDERAL AUTOMATED DATA PROCESSING (ADP) EQUIPMENT: A COMPILATION OF STATISTICS, 1981 Final Report
Martha Mulford Gray Nov. 1982 106 p refs
(PB83-164384; NBS-SP-500-97; LC-82-600638) Avail: NTIS HC A06/MF A01 CSCL 09B

This report presents data on the status of computer technology in the Federal Government. The report contains a combination of existing statistics from Federal Government and computer industry sources and original analyses and statistics based on these sources. Data is included on CPUs, disk units, magnetic tape units, I/O controllers, terminals, printers, plotters and other related ADP equipment. Analyses are included on the acquisition dates of CPUs, equipment installed by agencies, the purchase-price ranges of equipment, and the type and size class of general purpose computers in the Federal Government compared with the United States. The report is based on Federal Government data from

1971 through December 31, 1981 and industry data from 1972 through 1980. Author (GRA)

N83-30046# Intermetrics, Inc., Bethesda, Md.
COMPILER FEATURES: A SURVEY Final Report
B. M. Shahdad and E. Libster Jan. 1983 69 p refs
(Contract NB82-SBCA-1533)
(PB83-164418; IR-MD-006; NBS-GCR-82-418) Avail: NTIS HC A04/MF A01 CSCL 09B

In essence, a compiler is a software tool that translates a high level programming language into a low level one. As compilers have evolved, additional support features have been incorporated into them. In this report, the results of a two phased survey of FORTRAN and COBOL compilers are presented. The first phase of the survey was a literature search to determine features offered by current compilers. During the second phase, the results of the literature survey were verified by actually using a representative set of compilers. Author (GRA)

N83-30047# Office of Software Development, Falls Church, Va. Federal Conversion Support Center.
FCSC (FEDERAL CONVERSION SUPPORT CENTER) CONVERSION TOOLS SURVEY Final Report
Oct. 1982 253 p
(PB83-172635; OSD/FCSC-83-001) Avail: NTIS HC A12/MF A01 CSCL 09B

The FCSC Conversion Tools Survey dated October 1982 is intended to be one of the primary sources of information on conversion tools available to Federal agencies. In response to a survey and a notice in the Commerce Business Daily, each conversion vendor supplied up to date information on each tool available. The survey contains each tool, the vendor that markets it, a narrative of each tool, and a matrix of the tools by source and target hardware and source and target language. This survey supersedes the FCSC Conversion Products/Aids Survey dated October 1981 GSA/FCSC-81-004, NTIS Accession No. PB82-145459. GRA

N83-30048# Urban Mass Transportation Administration, Washington, D.C. Methods Div.
MICROCOMPUTERS IN TRANSPORTATION. VOLUME 1: SELECTED READINGS
Jan. 1983 124 p refs
(PB83-169904; UMTA-URT-41-83-2) Avail: NTIS HC A06/MF A01 CSCL 09B

The Urban Mass Transportation Administration (UMTA) and the Federal Highway Administration (FHWA) maintain up-to-date microcomputer references for transit and paratransit operators, transportation planners, and traffic engineers. This document is the starting point for those interested in microcomputers. This first section of this report serves as a primer designed to help the human service administrator or worker learn about microcomputers and about how to harness their capabilities. The section is directed at the interested reader who is familiar with human service work but unfamiliar with the arts of electronics, systems analysis, or data processing. Simple examples are used throughout, and technical language is kept to a minimum. The second section of this report provides basic information that can be used to evaluate and select a microcomputer. GRA

N83-30049# National Bureau of Standards, Washington, D.C. Inst. for Computer Sciences and Technology.
FUNCTIONAL SPECIFICATIONS FOR A FEDERAL INFORMATION PROCESSING STANDARD DATA DICTIONARY SYSTEM
Patricia A. Konig, ed., Alan Goldfine, ed., and Judith J. Newton, ed. Jan. 1983 421 p Prepared in cooperation with Alpha Omega Group
(Contract NB81-SBCA-0735)
(PB83-169441; NBSIR-82-2619) Avail: NTIS HC A18/MF A01 CSCL 09B

This interim report contains Functional Specifications for the basic functions that data dictionary software must perform to satisfy Federal agency requirements. The functionality specified will be incorporated into a planned Federal Information Processing Standard (FIPS) Data Dictionary System (DDS). The complete FIPS DDS also will contain additional specifications for such things as the user interface. Comments are being solicited from Federal agencies and suppliers of data dictionary software to determine any modifications that should be made to the Functional Specifications. Information about the effort to develop the planned FIPS DDS and a Management Overview of the Function Specifications are included. GRA

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N83-30050# Mathematisch Centrum, Amsterdam (Netherlands).
LINEAR PROGRAMMING AND FINITE MARKOVIAN CONTROL PROBLEMS
L. C. M. Kallenberg 1983 258 p refs
(Math-Centre-Tracts-148; ISBN-90-6196-236-6) Copyright. Avail: Issuing Activity

Linear programming, Markov decision processes, total reward and average reward criteria, bias optimality, two-person zero-sum stochastic games, and semi-Markov decision processes are discussed. Author

N83-30051# Oulu Univ. (Finland). Dept. of Mathematics.
ON LANGUAGE FAMILIES GENERATED BY COMMUTATIVE LANGUAGES Thesis
Juha Kortelainen and Olli Lehto, ed. Suomalainen Tiedeakatemia 1982 64 p refs
(ISSN-0355-0087; ISBN-951-41-0449-8) Copyright. Avail: Issuing Activity

Commutative languages form an interesting part of the general formal language theory. The structural properties of language families generated by commutative (or bounded) languages are usually simpler than those of ordinary language families. However, the properties of language families generated by commutative or bounded languages are used in the research of general problems of formal language theory. The general theory of bounded languages was developed first. Commutative languages are studied mainly under the set of (full) trio and AFL operations, sometimes augmented by intersection or substitution. Bounded languages are used as counterexamples, although some results concerning them are also achieved. Some concepts of formal language and automata theory are shortly reviewed. The concept of an a-transducer is discussed more accurately. Author

N83-30052*# SRI International Corp., Menlo Park, Calif.
DEVELOPMENT OF SOFTWARE FAULT-TOLERANCE TECHNIQUES Final Report
Peter Michael Melliar-Smith Jun. 1983 65 p refs
(Contract NAS1-15480)
(NASA-CR-172122; NAS 1.26:172122) Avail: NTIS HC A04/MF A01 CSCL 09B

As computers become more widely used, and in particular as they become used in more safety critical applications, the reliability of the computer system and its software becomes more important. There is also an increasing need for high levels of reliability in applications involving very large numbers of inexpensive units where recall of the units would be disproportionately expensive. The nature of faults and the assumptions made by different approaches to correct operation are considered. The recovery block approach is described and a probabilistic analysis of its effectiveness, with and without correlated design errors is provided. Mechanisms for generating acceptance tests from specifications, and for providing recovery in the presence of asynchrony, are described. An analysis of, and design for, the provision of recovery blocks in the microprogram of the Bendix BDX930 processor is provided. An example of the use of recovery blocks in a simple operating system is also provided. Author

N83-30053*# Informatics, Inc., Palo Alto, Calif.
BASIC JCL FOR THE CRAY-1 OPERATING SYSTEM (COS) WITH EMPHASIS ON MAKING THE TRANSITION FROM CDC 7600/SCOPE
Greg Howe and David Saunders Jul. 1983 29 p
(Contract NAS2-11555)
(NASA-CR-166499; NAS 1.26:166499) Avail: NTIS HC A03/MF A01 CSCL 09B

Users of the CDC 7600 at Ames are assisted in making the transition to the CRAY-1. Similarities and differences in the basic JCL are summarized, and a dozen or so examples of typical batch jobs for the two systems are shown in parallel. Some changes to look for in FORTRAN programs and in the use of UPDATE are also indicated. No attempt is made to cover magnetic tape handling. The material here should not be considered a substitute for reading the more conventional manuals or the User's Guide for the Advanced Computational Facility, available from the Computer Information Center. Author

N83-30054*# Georgia Univ., Athens.
FOR OPERATION OF THE COMPUTER SOFTWARE MANAGEMENT AND INFORMATION CENTER (COSMIC) Monthly Progress Report, Feb. 1983
James L. Carmon 15 Mar. 1983 30 p
(Contract NASw-3247)
(NASA-CR-172906; NAS 1.26:172906) Avail: NTIS HC A03/MF A01 CSCL 09B

Computer programs for relational information management data base systems, spherical roller bearing analysis, a generalized pseudoinverse of a rectangular matrix, and software design and documentation language are summarized. N.W.

N83-30055*# Intermetrics, Inc., Huntsville, Ala.
PDSS/IMC REQUIREMENTS AND FUNCTIONAL SPECIFICATIONS
1 Jun. 1983 167 p
(Contract NAS8-33825)
(NASA-CR-170801; NAS 1.26:170801; IR-AL-010) Avail: NTIS HC A08/MF A01 CSCL 09B

The system (software and hardware) requirements for the Payload Development Support System (PDSS)/Image Motion Compensator (IMC) are provided. The PDSS/IMC system provides the capability for performing Image Motion Compensator Electronics (IMCE) flight software test, checkout, and verification and provides the capability for monitoring the IMC flight computer system during qualification testing for fault detection and fault isolation. Author

N83-30056*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ALGORITHMS AND DATA STRUCTURES FOR ADAPTIVE MULTIGRID ELLIPTIC SOLVERS Final Report
John VanRosendale Jun. 1983 34 p refs
(Contract NAS1-17070)
(NASA-CR-172158; ICASE-83-29; NAS 1.26:172158) Avail: NTIS HC A03/MF A01 CSCL 09B

Adaptive refinement and the complicated data structures required to support it are discussed. These data structures must be carefully tuned, especially in three dimensions where the time and storage requirements of algorithms are crucial. Another major issue is grid generation. The options available seem to be curvilinear fitted grids, constructed on iterative graphics systems, and unfitted Cartesian grids, which can be constructed automatically. On several grounds, including storage requirements, the second option seems preferrable for the well behaved scalar elliptic problems considered here. A variety of techniques for treatment of boundary conditions on such grids are reviewed. A new approach, which may overcome some of the difficulties encountered with previous approaches, is also presented. Author

N83-30057*# Georgia Univ., Athens.
FOR OPERATION OF THE COMPUTER SOFTWARE MANAGEMENT AND INFORMATION CENTER (COSMIC) Monthly Progress Report, Jun. 1983
James L. Carmon 15 Jul. 1983 20 p
(Contract NASw-3247)
(NASA-CR-172901; NAS 1.26:172901) Avail: NTIS HC A02/MF A01 CSCL 09B

During the month of June, the Survey Research Center (SRC) at the University of Georgia designed new benefits questionnaires for computer software management and information center (COSMIC). As a test of their utility, these questionnaires are now used in the benefits identification process. Author

N83-30058*# Georgia Univ., Athens.
FOR OPERATION OF THE COMPUTER SOFTWARE MANAGEMENT AND INFORMATION CENTER (COSMIC) Monthly Progress Report, Apr. 1983
James L. Carmon 15 May 1983 27 p
(Contract NASw-3247)
(NASA-CR-172902; NAS 1.26:172902) Avail: NTIS HC A03/MF A01 CSCL 09B

Progress report on current status of computer software management and information center (COSMIC) includes the following areas: inventory, evaluation and publication, marketing, customer service, maintenance and support, and budget summary. B.G.

N83-30059*# Georgia Univ., Athens.
FOR OPERATION OF THE COMPUTER SOFTWARE MANAGEMENT AND INFORMATION CENTER (COSMIC) Monthly Progress Report, Mar. 1983
James L. Carmon 15 Apr. 1983 28 p
(Contract NASw-3427)
(NASA-CR-172903; NAS 1.26:172903) Avail: NTIS HC A03/MF A01 CSCL 09B

Computer programs for large systems of normal equations, an interactive digital signal process, structural analysis of cylindrical thrust chambers, swirling turbulent axisymmetric recirculating flows in practical isothermal combustor geometrics, computation of three dimensional combustor performance, a thermal radiation analysis system, transient response analysis, and a software design analysis are summarized. N.W.

N83-30060*# Georgia Univ., Athens.
FOR OPERATION OF THE COMPUTER SOFTWARE MANAGEMENT AND INFORMATION CENTER (COSMIC) Monthly Progress Report, May 1983
James L. Carmon 15 Jun. 1983 30 p
(Contract NASw-3247)
(NASA-CR-172904; NAS 1.26:172904) Avail: NTIS HC A03/MF A01 CSCL 09B

Computer programs for degaussing, magnetic field calculation, low speed wing flap systems aerodynamics, structural panel analysis, dynamic stress/strain data acquisition, allocation and network scheduling, and digital filters are discussed. Author

N83-30061*# Analytical Mechanics Associates, Inc., Mountain View, Calif.
OPTIM: COMPUTER PROGRAM TO GENERATE A VERTICAL PROFILE WHICH MINIMIZES AIRCRAFT FUEL BURN OR DIRECT OPERATING COST. USER'S GUIDE
May 1983 120 p refs
(Contract NAS1-15497)
(NASA-CR-166061; NAS 1.26:166061) Avail: NTIS HC A06/MF A01 CSCL 09B

A profile of altitude, airspeed, and flight path angle as a function of range between a given set of origin and destination points for particular models of transport aircraft provided by NASA is generated. Inputs to the program include the vertical wind profile, the aircraft takeoff weight, the costs of time and fuel, certain constraint parameters and control flags. The profile can be near optimum in the sense of minimizing: (1) fuel, (2) time, or (3) a combination of fuel and time (direct operating cost (DOC)). The user can also, as an option, specify the length of time the flight is to span. The theory behind the technical details of this program is also presented. Author

N83-30062*# Analytical Mechanics Associates, Inc., Mountain View, Calif.
TRAGEN: COMPUTER PROGRAM TO SIMULATE AN AIRCRAFT STEERED TO FOLLOW A SPECIFIED VERTICLE PROFILE. USER'S GUIDE
May 1983 71 p
(Contract NAS1-15497)
(NASA-CR-166062; NAS 1.26:166062) Avail: NTIS HC A04/MF A01 CSCL 09B

The longitudinal dynamics of a medium range twin-jet or tri-jet transport aircraft are simulated. For the climbing trajectory, the thrust is constrained to maximum value, and for descent, the thrust is set at idle. For cruise, the aircraft is held in the trim condition. For climb or descent, the aircraft is steered to follow either (a) a fixed profile which is input to the program or (b) a profile computed at the beginning of that segment of the run. For climb, the aircraft is steered to maintain the given airspeed as a function of altitude. For descent, the aircraft is steered to maintain the given altitude as a function of range-to-go. In both cases, the control variable is angle-of-attack. The given output trajectory is presented and compared with the input trajectory. Step climb is treated just as climb. For cruise, the Breguet equations are used to compute the fuel burned to achieve a given range and to connect given initial and final values of altitude and Mach number. Author

N83-30063# California Univ., San Diego. Center for Human Information Processing.
NATURAL ARTIFICIAL LANGUAGES: LOW-LEVEL PROCESSES
Gary Perlman Dec. 1982 101 p refs
(Contract N00014-79-C-0323)
(AD-A125800; ONR-8208) Copyright. Avail: NTIS HC A06/MF A01 CSCL 05/7

An artificial language is one created for concise and precise communication within a limited domain such as mathematics. A natural artificial language is one that people find easy to learn and use. The author discusses low-level properties of natural artificial languages, especially those in which names are chosen for concepts, and symbols are chosen for names, a class of artificial languages he calls linguistically mediated artificial languages. These properties include choosing mnemonic symbols for names, and suggestive names for concepts, and using both internally and externally consistent syntax. He outlines a model of processing linguistically mediated artificial language and present results from experiments in support of the model. The results of the experiments are applied to the design of a user interface to a programming system, demonstrating their practicality along with their theoretical interest. The research shows the tradeoffs in designing natural artificial languages: naturalness in a specific domain is gained at the cost of generality for other domains. Author (GRA)

N83-30064# Lowell Univ., Mass.
AUTOMATIC SCALING OF DIGISONDE IONOGRAMS TEST AND EVALUATION REPORT Report, 1 Oct. 1981 - 30 Sep. 1982
Bodo W. Reinisch, Jane S. Tang, and Robert R. Gamache Sep. 1982 90 p refs
(Contract F19628-80-C-0064; AF Proj. 4643)
(AD-A125830; ULF-421/CAR; SCIENTIFIC-4; AFGL-TR-82-0324) Avail: NTIS HC A05/MF A01 CSCL 12/1

Ionograms contain as basic information the virtual range versus frequency. The Digisonde 128PS also measures amplitude, phase, polarization, incidence angle and the spectral signature of the echoes. This allows automatic scaling of the ionograms and conversion to vertical electron density profiles. This report discusses the automatic scaling of some 8000 Digisonde ionograms from the Goose Bay Ionospheric Observatory (64.6N geomagnetic) of the Air Force Geophysics Laboratory. These ionograms display a large variety of features: quiet and disturbed daytime recordings, heavy spread F during the night, the mid-latitude trough moving over the station, fast variation of the ionospheric parameters and frequent absorption events. Sections 2, 3 and 4 give a brief description of the data base and the automatic scaling methods that extract the required ionospheric parameters from the digital ionograms. A few examples illustrate the results of the profile-fitting method that is used to calculate the electron density profiles from the autoscaled echo traces. It is the first time that anybody has succeeded to automatically scale a large number of quiet and disturbed ionograms. The Automatic Real Time Ionogram Scaler with True Height Calculation (ARTIST) which is based on the 8086 microprocessor is briefly described in Section 6. GRA

N83-30065# Lowell Univ., Mass. Center for Atmospheric Research.
PROCESSING OF DIGITAL IONOGRAMS
Bodo W. Reinisch Hanscom AFB, Mass. AFGL Apr. 1981 30 p refs
(Contracts F19628-80-C-0064; DNA001-77-C-0187; AF Proj. 4643)
(AD-A125831; AFGL-TR-81-0085; ULRF-414/CAR; SR-1) Avail: NTIS HC A03/MF A01 CSCL 09/2

This presentation is a summary of digital ionogram processing techniques. Real-time and on-line methods were emphasized and this implies continuing improvement and increasing complexity of the processing algorithms along with the technological advancements. Of course, a mini or mainframe computer with sufficient memory could perform the processing described here. But for on-line operation at an ionosonde field site cost and environmental conditions generally exclude this approach, and special purpose hardware/microprocessor techniques are the only adequate method. The difference between mini- and microcomputers is diminishing, but the modular microcomputer systems have the advantage of being easily integrated into a digital ionosonde at low costs. The Digisonde 128PS initially outputs complete ionograms (in the ionogram mode) with amplitude, phase, Doppler, incidence angle and/or polarization for each frequency-range bin. Post-processing of these ionograms can then extract the ionospheric parameters required for specific investigations. A simple microcomputer algorithm is shown which calculated the electron density profiles from the h'(f) trace during the 1978 Kwajalein Equatorial Spread F campaign. GRA

N83-30066# University of Southern California, Marina del Rey. Inst. for Information Sciences.
AUTOMATED PROTOCOL VERIFICATION
Carl A. Sunshine and David A. Smallberg Oct. 1982 109 p refs
(Contract MDA903-81-C-0335)
(AD-A126271; ISI/RR-83-110) Avail: NTIS HC A06/MF A01 CSCL 09/2

Four general-purpose automated verification systems (Affirm, Formal Development Methodology (Ina Jo), Gypsy, and Concurrent State Deltas) were applied to computer network protocols in order to evaluate the ability of such systems to provide significant results in formal protocol specification and verification. Each system had a particular strength: Affirm was most polished and flexible; FDM supported abstract machine specifications directly; Gypsy supported stateless I/O (Input/Output) history type specifications; CSD supported more automatic proof and timing properties. However, none of the systems had all necessary features or was powerful enough to fully handle complex protocols. The relative strengths of the systems are compared, detailed examples of their use are presented, and suggestions for further work are given.
Author (GRA)

N83-30067# Air Force Human Resources Lab., Brooks AFB, Tex. Software Development Sect.
PRISM: A GENERAL PURPOSE PROGRAMMING SYSTEM Final Technical Report
Charles R. Rogers and Steven A. O'Hara Mar. 1983 17 p
(AF Proj. 6323)
(AD-A126228; AFHRL-TP-82-44) Avail: NTIS HC A02/MF A01 CSCL 09/2

This paper describes the development, uses, and features of the general purpose programming system PRISM, which is the foundation for future program development by the Computer Programming Branch and is available to all personnel within the Air Force Human Resources Laboratory (AFHRL). PRISM was designed to meet the need for an efficient and reliable program-

ming tool that could be used like a high-order programming language but still provide the operating system interface and hardware controls of assembly language. It has special features that make it an especially powerful tool for new software development. These features were derived from an extensive analysis of coding sequences in existing library programs, interactions between library programs, and the identification of common programming procedures. PRISM was specifically designed for the development of general purpose programs by the Technical Services Division of AFHRL within the Computer Programming Branch; however, it is also an effective and efficient tool for applications programmers. Author (GRA)

N83-30068# Command and Control Technical Center, Washington, D. C. Office of Computer Services.
GENERALIZED MONITORING FACILITY. USERS MANUAL, CHANGE 4: COMPUTER SYSTEM MANUAL
1 Jan. 1983 243 p
(AD-A126234; CCTC-CSM-UM-246-82-CHG-4) Avail: NTIS HC A11/MF A01 CSCL 09/2

The Users Manual describes each of the programs in the Generalized Monitoring Facility (GMF), discusses input options required to run each program, and provides sample outputs generated by each program. The Generalized Monitoring Facility is delivered on a FILSYS SAVE tape. A description of the software is presented in section 2. Installation procedures for the GMF Monitor and guidance on how to run GMF can be found in section 5 of this manual. Author (GRA)

N83-30069# Command and Control Technical Center, Washington, D. C. Office of Computer Services.
GENERALIZED MONITORING FACILITY. USERS MANUAL, CHANGE 5: COMPUTER SYSTEM MANUAL
1 Apr. 1983 81 p
(AD-A126235; CCTC-CSM-UM-246-82-CHG-5) Avail: NTIS HC A05/MF A01 CSCL 09/2

This Users Manual provides the information necessary for an individual to run all of the programs that are comprised in the Generalized Monitoring Facility (GMF). Program interrelationships are presented, as well as a general overview of the processing, input, and output procedures for each program. Formate and examples fo user-controlled input data and sample program outputs are shown and explained. Additionally, the Job Control Language (JCL) deck setups necessary to run the programs are provided. This manual supersedes Command and Control Technical Center CSM UM 246-81, 1 May 1981. Author (GRA)

N83-30070# Texas Univ., Austin. Center for Cybernetic Studies.
A SUCCESSIVE LINEAR PROGRAMMING METHOD AND ITS CONVERGENCE ON NONLINEAR PROBLEMS
J. Zhang (Shanghai Normal College) Jan. 1983 30 p refs
(Contract N00014-82-K-0295)
(AD-A126240; CCS-450) Avail: NTIS HC A03/MF A01 CSCL 12/2

Since Griffith and Stewart firstly proposed as successive linear programming method for solving general nonlinear programming problems, such methods have been widely used in practice because of their ease of implementation and their ability to deal with large scale problems. However, neither the original version, nor a more recent one contain convergence proofs possibly because of non-robustness of their algorithms. Using exact penalty functions and Levenberg Marquardtlike steps, an improved algorithm has been recently devised. In this paper, we give this modified SLP method a theoretical analysis and covergence proof, and thereby provide a sound basis for it. Author (GRA)

N83-30071# Advanced Information and Decision Systems, Mountain View, Calif.
ADVANCED TOOLS FOR SOFTWARE MAINTENANCE Final Technical Report, 9 Jun. 1980 - 7 Apr. 1982
Jeffrey S. Dean and Brian P. McCune Griffiss AFB, N.Y. RADC Dec. 1982 167 p refs
(Contract F30602-80-C-0176; AF Proj. 5581)
(AD-A126146; RADC-TR-82-313; AI/DS-TR-3006-1) Avail: NTIS HC A08/MF A01 CSCL 09/2

This is the final report on a project entitled Software Maintenance Techniques. The purpose of this project was to study and design advanced software maintenance tools and techniques for the future ADA programming environment. Current maintenance practices for Air Force C31 (Command Control Communications and Intelligence) software were studied. Three out of the four major problems identified were attributed to the difficulty of comprehending software. Nine tools have been proposed to help solve these and other problems, including a tool to help coordinate the programming process (the Programming Manager), a tool to aid in the collection and use of documentation (the Documentations Assistant), and an editor that is knowledgeable about what it is editing (the Intelligent Editor). The nine tools are based on the computer science technologies of artificial intelligence (particularly knowledge-based and expert systems), automatic programming, intelligent user interfaces, formal verification, software engineering, programming environments, software metrics and computer-assisted instruction. GRA

N83-30072# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
REQUIREMENTS FOR NATURAL LANGUAGE UNDERSTANDING IN A SYSTEM WITH GRAPHIC DISPLAYS
Candace L. Sindner and Madeleine Bates Mar. 1983 55 p refs
(Contract N00014-77-C-0378; ARPA Order 3414)
(AD-A126065; BBN-5242) Avail: NTIS HC A04/MF A01 CSCL 09/2

The particular task we explored was that of a decision maker examining and modifying a database using a graphics display. The decision maker is expected to manipulate both the context of the database and the form of the display. This paper presents three aspects of our research on a system that can provide graphically represented information and can talk naturally with a user about that information: description of the methodology that we used in developing and analyzing an extended prototypical dialogue between a user and such a system; portions of our analysis of that dialogue that present both the information obtained and the method of obtaining it; and conclusions about the necessary linguistic and non-liguistic capacities of an intelligent conversational partner, as drawn from the full analysis. Author (GRA)

N83-30073# Naval Postgraduate School, Monterey, Calif. Dept. of Operations Research.
NON-PARAMETRIC STATISTICAL SOFTWARE FOR THE TRS-80 MICROCOMPUTER M.S. Thesis
Robert Lee Zangmeister, Jr. Dec. 1982 107 p refs
(AD-A126055) Avail: NTIS HC A06/MF A01 CSCL 09/2

This paper documents the development of a non-parametric statistics package for the TRS-80 microcomputer. The package is comprised of ten programs with the major emphasis on non-parametric hypothesis testing. The programming language is TRS-80 Level II Disk Basic. The package is compatible with any disk based TRS-80 Model I/III compatible microcomputer. With modification of the screen display and the disk access commands, the package is transportable to microcomputers produced by other manufacturers. The statistical analysis capability implemented on a relatively inexpensive system provides a useful tool to the student or the trained analyst. Author (GRA)

N83-30074# Honeywell Systems and Research Center, Minneapolis, Minn.
IMAGE PROCESSING AND DIGITIZATION FACILITY Final Report
Karl Fant and Scott Johnston Dec. 1982 37 p
(Contract DAAK70-79-Q-0449)
(AD-A126307; REPT-82SRC62) Avail: NTIS HC A03/MF A01 CSCL 14/2

The Image Processing and Digitization Facility (IPDF) is a sophisticated system of fully integrated hardware and software for engineering advanced image-processing algorithms. The IPDF combines highly specialized hardware elements in a generalized

software environment that provides consistent and convenient access to all elements of the system. The IPDF provides the research scientist with command-level access to all image functions to facilitate quick evaluation and development of new algorithm ideas. The IPDF then supports the implementaiton of efficient simulations to test algorithms over large databases of images. The IPDF is a research tool which provides all the facilities for design and development of state-of-the-art image-processing algorithms. Author (GRA)

N83-30075# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
SPECIFYING RELIABILITY AS A SOFTWARE ATTRIBUTE Interim Report
Ivor Durham and Mary Shaw 6 Dec. 1982 38 p refs
(Grant NSF MCS-80-11409)
(AD-A125934; CMU-CS-82-148) Avail: NTIS HC A03/MF A01 CSCL 09/2

This paper examines come issues in specifying reliability as a software attribute. A scheme for characterizing software reliability, known as a failure profile, is introduced. Failure profiles are derived for particular implementations of an abstraction by identifying analytically the behavior of the module when software or hardware faults occur. A failure profile is developed for a sorting program to demonstrate an informal technique for identifying the consequences of faults. The derived failure profile is compared with observations of the program's behavior in the presence of artificially induced faults to demonstrate the effectiveness of the failure profile characterization of software reliability. The issues raised in the application of the informal technique are discussed with respect to developing a formal and more mechanical technique for producing and using failure profiles. Author (GRA)

N83-30076# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
LOCAL CODE GENERATION AND COMPACTION IN OPTIMIZING MICROCODE COMPILERS Interim Report
Steven R. Vegdahl Dec. 1982 189 p refs
(Contract F33615-78-C-1551; ARPA Order 3597)
(AD-A126026; CMU-CS-82-153) Avail: NTIS HC A09/MF A01 CSCL 09/2

Horizontal micro-architectures often have features that make it difficult for a compiler to produce good object code from a high-level language. Although the problem of compacting microcode into a near-minimal number of microinstructions has received a great deal of attention, other phases of the compiler have not been studied as thoroughly. This dissertation explores methods of generating quality microcode for horizontal microarchitectures, compacting the microcode, and the interaction between code generation and compaction. There are often several code sequences that perform the same computation for a given micro-architecture. If the code generation and compaction phases of the compiler are executed sequentially, the code generator may not be able to determine the best code, because a code sequence that compacts well in one situation may contain several bottlenecks in another. This dissertation explores three methods of coupling the code generation and compaction phases of the compiler, and concludes that subtle micromachine features make it very difficult to produce good code unless the code generator actually produces several candidate code sequences that are compacted and compared with one another. GRA

N83-30077# Naval Postgraduate School, Monterey, Calif. Dept. of Operations Research.
AN ENHANCED CONVERSION SCHEME FOR LEXICOGRAPHIC, MULTIOBJECTIVE INTEGER PROGRAMS
James P. Ignizio (Pennsylvania State Univ.) and Lyn C. Thomas (Manchester Univ.) Dec. 1982 20 p refs
(RR0000110)
(AD-A125527; NPS55-82-035) Avail: NTIS HC A02/MF A01 CSCL 12/2

A number of approaches have been proposed (and several implemented) for the solution of lexicographic, multiobjective programming problems. These approaches may be divided into two classes. The first encompasses the development of algorithms specifically designed to deal directly with the initial model while the second attempts to transform, efficiently, the lexicographic, multiobjective model into an equivalent, single objective programming problem. This second approach would appear particularly attractive since it permits the use of conventional, readily available, mathematical programming software. In this paper we address a particular form of the lexicographic, multiobjective model; specifically one in which all functions are linear and all variables integer. It is then shown how a recently developed scheme for the transformation of this model may be substantially improved. As a result, lexicographic, multiobjective integer linear programs may be easily converted into conventional linear integer programs wherein the magnitude of the objective function coefficients are minimized. Author (GRA)

N83-30078# Kaman Sciences Corp., Colorado Springs, Colo.
DEVELOPMENT AND QUALIFICATION OF COMPUTER-AIDED ASSESSMENT (CAS) Final Report
R. Larry Williams and Nicholas Zuck Dover, N.J. Army Armament Research and Development Command Feb. 1983 145 p refs
(Contract DAAK10-81-C-0316)
(AD-A125477; AD-E400974; ARPAD-CR-83022;
DRDAR-QAM-72-82) Avail: NTIS HC A07/MF A01 CSCL 09/2

Maximum utilization of computer-aided assessments (CAS) techniques and proper understanding of nuclear safety and reliability assessments can be achieved by the use of a program called GO. This document is a basic, yet substantive, qualification of the GO methodology and its computer software. Principal emphasis is placed on the event-tree concept upon which GO is based and on the use of the defined operator types (which represent components) to develop system models. The use of GO software to manipulate models and component data to generate the probabilities of occurrence of system events (reliability, safety, availability) is explained and exemplified. Seven sample systems are analyzed. A qualification of the fault finder and effect evaluation software is provided. The fault finder capability identifies component failures which singly or in confidence cause system failures. The effect evaluation capability develops confidence bounds on system estimates as a function of data uncertainties. GRA

N83-30079# Connecticut Univ., Storrs. Lab. for Computer Science Research.
GENERATING NATURAL LANGUAGE EXPLANATIONS IN A COMPUTER-AIDED DESIGN SYSTEM
Marie A. Bienkowski, R. E. Cullingford, and M. W. Krueger Jan. 1983 106 p refs
(Contract N00014-79-C-0976)
(AD-A126190; TR-CS-83-1) Avail: NTIS HC A06/MF A01 CSCL 09/2

CADHELP is a graphics-based computer-aided design system which contains detailed knowledge bases intended to support three different types of intelligent behavior: (1) the generation of natural-language explanations concerning the operation of the graphical features, for use by naive users; (2) an animated display coordinated with the explanation, simulating the feature's use; and (3) control of the operation of the CAD system itself, by interpretation of knowledge structures describing the system's operation. This final report is a detailed description of the knowledge-base summarization and generation methods developed for CADHELP, which are the basis for the three different sources of knowledge. The Explanation Mechanism devised for CADHELP describes the CAD commands CADHELP can execute using test and graphical animation. A unique feature of this system is that neither the text nor the animation are stored, but are generated from a representation of knowledge about how to use CADHELP. This representation, called a feature script, is a set of concepts linked by causal relations. Since the feature scripts developed were very detailed to enable the animator to work, a means of pruning the script to produce natural-sounding text was needed. A selector mechanism, called HELPCON, was developed to select concepts for expression

from the feature scripts using rules on how to conduct an explanation. The concepts thus selected are generated as English sentences by another module called OGEN, which prunes a concept to express it in a concise form much as HELPCON does. GRA

N83-30080# Minnesota Univ., Minneapolis. Dept. of Computer Science.
DIDA: DYNAMIC IMAGE DISPARITY ANALYSIS Final Report, Jul. 1981 - Dec. 1982
William B. Thompson and Joseph K. Kearney Wright-Patterson AFB, Ohio AFWAL 31 Dec. 1982 103 p refs
(Contract F33615-81-K-1541)
(AD-A126327; AFWAL-TR-83-1035) Avail: NTIS HC A06/MF A01 CSCL 09/2

Disparity is a point by point characterization of the translational changes in an image sequence due to motion of the sensor or objects under view. Accurate estimates of disparity are required in order to understand scene dynamcis and to determine a wide variety of spatial relationships. This report describes the results of the first phase of the Dynamic Image Disparity Analysis (DIDA) project. The DIDA project was initiated in order to develop methods for estimating motion induced disparity in real-time. The report outlines the types of approaches possible for estimating disparity. An extensive discussion on evaluating different approaches follows. Precise evaluation criteria are crucial if meaningful performance stands for DIDA are to be developed. The report argues that no single measure of accuracy is meaningful. Instead, performance should be characterized by a collection of measures. The evaluation of alternate disparity estimation techniques must consider this collection of measures together with a precise task analysis. In particular, different applications have different and often contradictory accuracy requirements. GRA

N83-30081# Maryland Univ., College Park. Inst. for Physical Science and Technology.
AN INTRODUCTION TO THE FEARS (FINITE ELEMENT ADAPTIVE RESEARCH SOLVER) PROGRAM
Ivo Babuska (David W. Taylor Naval Ship R&D Center), Donald A. Gignac, and Charles K. Mesztenyi Bethesda, Md. DTNSRDC Feb. 1983 41 p refs
(Contracts N00176-82-M-0743; N00167-82-M-0636; ZR0140201)
(AD-A127737; DTNSRDC/CMLD-83/04) Avail: NTIS HC A03/MF A01 CSCL 09/2

This report is an introduction to the Finite Element Adaptive Research Solver (FEARS) computer program. It briefly describes the mathematical problem solved by FEARS. It tells how to prepare the input data for FEARS and how to interpret the output provided by FEARS. A composite shaft problem is provided as an example. GRA

N83-30082# Naval Research Lab., Washington, D. C.
RESTRAINED LEAST-SQUARES PROGRAM (RESLSQ) USERS MANUAL Interim Report
Judith L. Flippen-Anderson, Richard Gilardi, and John H. Konnert 28 Mar. 1983 63 p refs
(RR0110341)
(AD-A126171; NRL-MR-5042) Avail: NTIS HC A04/MF A01 CSCL 09/2

A restrained least-squares program package is available for analysis of X-ray diffraction data from small and medium sized molecules. The package consists of three basic programs. The first, SCATT, prepares a binary data file which contains scattering factor information for each reflection. The second, MODEL, constructs the 'ideal' molecule towards which the experimental model is refined. The third, RESLSQ, performs the least-squares refinement using conjugant gradient sparse-matrix methods. Author (GRA)

N83-30083# Los Alamos Scientific Lab., N. Mex.
SENSIT-2D: A TWO-DIMENSIONAL CROSS-SECTION SENSITIVITY-AND UNCERTAINITY-ANALYSIS CODE
Mark J. Embrechts Oct. 1982 99 p refs
(Contract W-7405-eng-36)
(DE83-004479; LA-9515-MS) Avail: NTIS HC A05/MF A01

SENSIT-2D is a computer program that calculates the sensitivity and/or uncertainty for an integral response (e.g., heating, radiation damage), obtained from the two dimensional discrete ordinates transport code TRIDENT-CTR, to the cross sections and cross section uncertainties. A design sensitivity option allows one to calculate the integral response when the cross sections in certain regions are changed. A secondary energy distribution sensitivity and uncertainty analysis capability is included. SENSIT-2D incorporates all the essential features of TRIDENT-CTR (r,z geometry option, triangular mesh, nonorthogonal boundaries, group dependent quadrature sets) and is aimed at the needs of the fusion community. The structure of SENSIT-2D is similar to the structure of the SENSIT code, a one dimensional sensitivity and uncertainty analysis code. The theory used in SENSIT-2D, the code structure is outlined, and detailed input specifications are given. Two sample problems which illustrate the use of SENSIT-2D are explained. DOE

N83-30084# Princeton Univ., N. J.
THOUGHTS ON THE EVOLUTION OF DYNAMIC GRAPHICS
John W. Tukey (Bell Telephone Labs.) 1982 11 p Presented at the Stanford Workshop on Advanced Statistical Graphics, Stanford, Calif., 26-29 Jul. 1982
(Contract DE-AC02-81ER-10841)
(DE83-006146; CONF-820768-1) Avail: NTIS HC A02/MF A01

Limitations and opportunities in the evolution of dynamic graphics are discussed. Hardware availability; software environment; imagination about actions; imagination about display; imagination about support algorithms; imagination about system structures (specifically stash and control); and users are discussed. DOE

N83-30085# California Univ., Livermore. Lawrence Livermore Lab. Electronics Engineering Dept.
FDAS EPROM PROGRAMMING MANUAL
John Baker Jul. 1982 10 p
(Contract W-7405-eng-48)
(DE82-019229; UCID-19432) Avail: NTIS HC A02/MF A01

This brief manual is intended as a guide for producing programmed Erasable Programmable Read Only Memories (EPROMs) for the microprocessor based data acquisition system. Also included is a section on verifying the EPROMs in an FDAS unit. DOE

N83-30086# California Univ., Livermore. Lawrence Livermore Lab.
IMAGE-ENHANCEMENT APPLICATIONS AT THE LAWRENCE LIVERMORE NATIONAL LABORATORY
R. E. Twogood, R. J. Sherwood, and M. R. Portnoff Jun. 1982 8 p refs Presented at the 26th Tech. Symp. and Exhibition of the Intern. Soc. for Optical Eng., San Diego, Calif., 21-27 Aug. 1982
(Contract W-7405-eng-48)
(DE82-019312; UCRL-87784; CONF-820822-6) Avail: NTIS HC A02/MF A01

A diverse set of digital image-processing applications exists at the Lawrence Livermore National Laboratory. While many of these include some sort of image analysis or restoration, virtually all of them require image-enhancement procedures. In this paper we describe the principal image-processing facility at the Laboratory, followed by a discussion of several of the major image-processing application areas. DOE

N83-30087# Brookhaven National Lab., Upton, N. Y. National Center for Analysis of Energy Systems.
MEASURES OF VALUE IN A LINEAR-PROGRAMMING MODEL OF THE US ENERGY SYSTEM
Douglas Hill 1982 18 p refs Presented at the Inst. for Management Sci./Operations Res. Soc. of Am. Joint Meeting, San Diego, Calif., 25 Oct. 1982
(Contract DE-AC02-76CH-00016)

(DE83-006685; BNL-32044; CONF-821012-4) Avail: NTIS HC A02/MF A01

The time phased linear program called MARKAL (Market Allocation) evaluates the merits of candidate new energy technologies in the 1980 to 2020 time period. Identical versions of the model were developed by DOE and the Federal Republic of Germany, using two different computer systems. Three types of objective functions were considered: total cost to the nation of the energy system, discounted to a present value; oil imports during the 45 year time frame; and a cost consisting of the sum the total cost times a factor of the total oil imports. This factor is basically the extra market cost per unit of oil imports or as a subcharge. Computer runs are evaluated for sixteen scenarios. DOE

N83-30088# Computer Corp. of America, Cambridge, Mass.
CODASYL QUERY LANGUAGE FLAT (CQLF) SPECIFICATIONS
Frank Manola and Alain Pirotte Dec. 1982 144 p
(Contract NB-79-SBCA-0088)
(PB83-164376; CCA-81-10; NBS-GCR-82-415) Avail: NTIS HC A07/MF A01 CSCL 09B

CQLF is a high level language for defining, accessing, and manipulating data in data bases described using the 1981 ANS dpANS version of the CODASYL Data Description Language. CQLF has similarities to both the SQL and QUEL query languages, both of which have been widely discussed in the research literature on the relational data model. The CODASYL data model has traditionally been associated with batch oriented, record at a time data processing, but many of the same principles that have been developed for the relational model also apply to the CODASYL model. Data base administrators can use CQLF to define ANSI compliant schemes, and users can manipulate data with a sequence of CQLF statements. Implementation of this specification would dramatically enhance ad hoc access to CODASYL data bases. GRA

N83-30089# Rice Univ., Houston, Tex. Dept. of Electrical Engineering.
PROGRAMS FOR SOLVING POLYNOMIAL EQUATIONS
B.-C. Chang May 1982 45 p
(Grant NSF ECS-81-02895)
(PB83-167171; NSF/ECS-83006) Avail: NTIS HC A03/MF A01 CSCL 09B

In this report four FORTRAN programs are presented for the solution of several problems arising in linear multivariable control theory. These programs can be used for the following: to find a left MFD of a given transfer function matrix such that the denominator matrix is row proper; for a given nonsingular polynomial matrix D(s), to find a unimodular matrix W(s); to check if a given nonsingular polynomial matrix is unimodular and find its inverse if it is unimodular; to find the unimodular matrices in a generalized Bezout identity for a given transfer function matrix; to solve the given polynomial matrix equations. Some examples are illustrated for each program. These examples are implemented on the computer PDP-11/45 at Rice University. Author (GRA)

N83-30090# Rutherford High Energy Lab., Chilton (England). Science and Engineering Research Council.
GKS (GRAPHICAL KERNEL SYSTEM), THE FIRST GRAPHICS STANDARD
F. R. A. Hopgood Jan. 1982 254 p
(PB83-166595; RL-82-007) Avail: NTIS HC A12/MF A01 CSCL 09B

This report outlines the development of computer graphics, discusses the need for standards and relates the events that led to the appearance of Graphical Kernel System (GKS). GKS provides a set of functions for computer graphics programming and can be used by the majority of applications that produce computer-generated pictures. The bulk of the document is a draft international standard comprising a functional description of GKS, which covers the system, its functions and data structure. Some sample programs are also included. GRA

N83-30091# Rutherford High Energy Lab., Chilton (England). Science and Engineering Research Council.
A REVIEW OF CURRENTLY AVAILABLE HIGH PERFORMANCE INTERACTIVE GRAPHIC SYSTEMS
S. A. Clark and J. Harvey 1982 14 p
(PB83-165951; RL-81-088) Avail: NTIS HC A02/MF A01 CSCL 09B

A brief survey is presented of four interactive graphics systems that were considered for a new graphics facility at the Rutherford Appleton Laboratory. Three of the systems considered were based on calligraphic technology and offered real-time animation, such as 3-D rotation. The fourth system considered was a raster (sweep generator) graphics device, the technology of which was undergoing rapid development. A brief outline of each system's architecture is given, with diagrams; detailed features are summarized in an appendix. A discussion of the relative merits of the systems as found by the authors during visits to several installations is also presented. GRA

N83-30092# National Bureau of Standards, Washington, D.C. Automated Production Technology Div.
INITIAL GRAPHICS EXCHANGE SPECIFICATION (IGES), VERSION 2.0 Report, May 1980 - Nov. 1982
Bradford M. Smith, Kalman M. Brauner (The Boeing Co.), Philip R. Kennicott (General Electric), Michael Liewald (The Boeing Co.), Joan Wellington et al Feb. 1983 341 p refs Sponsored in part by the Air Force ICAM Program, Wright-Patterson AFB, Ohio
(PB83-137448; NBSIR-82-2631-AF) Avail: NTIS HC A15/MF A01 CSCL 09B

This document contains Version 2.0 of the Initial Graphics Exchange Specification, a defined format for the creation of a file which enables data found in today's commercially available CAD/CAM systems to be exchanged or archived. IGES, Version 1.0, published as NBSIR 80-1978 (R) in January 1980, consisted of entity definitions for geometry, drafting and structural information. Definition entities were provided as a means of expanding the utility of IGES. Version 2.0 of the Specification has been extended in the advanced geometry, electrical, and finite element modeling areas. In addition, the Specification has been reformatted and clarified to enable the user to reference the document more easily. GRA

N83-30093# Cramer (H.E.) Co., Inc., Salt Lake City, Utah.
USER'S INSTRUCTIONS FOR THE SHORTZ AND LONGZ COMPUTER PROGRAMS, VOLUME 1 Final Report
Jay R. Bjorklund and James F. Bowers Mar. 1982 338 p refs 2 Vol.
(Contract EPA68-02-2547)
(PB83-146100; TR-82-131-01-Vol-2; EPA-903/9-82-004A) Avail: NTIS HC A15/MF A01 CSCL 13B

A detailed technical discussion of the dispersion model equations implemented by SHORTZ and LONGZ and detailed user's instructions for the two programs are discussed. Author (GRA)

N83-30094# Cramer (H.E.) Co., Inc., Salt Lake City, Utah.
USER'S INSTRUCTIONS FOR THE SHORTZ AND LONGZ COMPUTER PROGRAMS, VOLUME 2 Final Report
Jay R. Bjorklund and James F. Bowers Mar. 1982 366 p refs 2 Vol.
(Contract EPA-68-02-2547)
(PB83-146092; TR-82-131-01-Vol-1; EPA-903/9-82-004B) Avail: NTIS HC A16/MF A01 CSCL 13B

Complete listings of the SHORTZ and LONGZ programs, example SHORTZ and LONGZ problems, coding forms for card input to SHORTZ and LONGZ, discussions of the development and testing of the stack-tip downwash and complex terrain algorithms used by SHORTZ and LONGZ, and a SHORTZ meteorological preprocessor program for use with National Weather Service (NWS) surface and upper-air meteorological data are provided. Author (GRA)

62 COMPUTER SYSTEMS

Includes computer networks.

N83-30095*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
PROCEEDINGS OF THE 1ST SPACE PLASMA COMPUTER ANALYSIS NETWORK (SCAN) WORKSHOP
James L. Green, J. H. Waite, J. F. E. Johnson (Southampton Univ., Engl.), Joseph R. Doupnik (Utah State Univ.), and Rod A. Heelis (Texas Univ., Dallas) Apr. 1983 33 p refs Workshop held at Huntsville, Ala.
(NASA-TM-82514; NAS 1.15:82514) Avail: NTIS HC A03/MF A01 CSCL 09B

The purpose of the workshop was to identify specific cooperative scientific study topics within the discipline of Ionosphere Magnetosphere Coupling processes and to develop methods and procedures to accomplish this cooperative research using SCAN facilities. Cooperative scientific research was initiated in the areas of polar cusp composition, O+ polar outflow, and magnetospheric boundary morphology studies and an approach using a common metafile structure was adopted to facilitate the exchange of data and plots between the various workshop participants. The advantages of in person versus remote workshops were discussed also. Author

N83-30096# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
RESOURCE SHARING IN A NETWORK OF PERSONAL COMPUTERS Ph.D. Thesis. Interim Report
Roger Berry Dannenberg Dec. 1982 163 p refs
(Contract F33615-81-K-1539)
(AD-A126003; CMU-CS-82-152) Avail: NTIS HC A08/MF A01 CSCL 09/2

As networks of personal computers are developed to replace centralized time-shared systems, the need for sharing resources will remain, but the solutions developed for time-sharing will no longer be adequate. In particular, the sharing of network resources is complicated by issues of security and autonomy, since a network of personal computers may be composed of nodes that are completely controlled by their owners. To facilitate sharing in this sort of environment, an operating system component called the Butler is proposed. As a host, the Butler is responsible for administering a sharing policy on its local machine. This includes authenticating sharers, granting rights in accordance with a locally established policy, and creating execution environments for guests. As an agent, the Butler negotiates with hosts on remote machines to obtain resources requested by a client, and performs authentication to discourage a remote host from exploiting the client. A number of applications for the Butler are described: these fall into the categories of information exchange, load distribution, and computational parallelism. A prototype Butler has been constructed and used in a real application demonstrating computational parallelism, and the prototype has also demonstrated the deportation of processes. GRA

N83-30097# Oak Ridge National Lab., Tenn. Fusion Energy Div.
THE COMPUTER DATA-ACQUISITION AND CONTROL SYSTEM FOR THOMSON-SCATTERING MEASUREMENTS
K. A. Stewart, R. D. Foskett, R. R. Kindsfather, E. A. Lazarus, and C. E. Thomas Mar. 1983 30 p refs
(Contract W-7405-eng-26)
(DE83-008167; ORNL/TM-8553) Avail: NTIS HC A03/MF A01

The Thomson-Scattering Diagnostic System (SCATPAK II) used to measure the electron temperature and density in the Impurity Study Experiment is interfaced to a Perkin-Elmer 8/32 computer that operates under the OS/32 operating system. The calibration, alignment, and operation of this diagnostic are all under computer control. Data acquired from 106 photomultiplier tubes installed on 15 spectrometers are transmitted to the computer by eighteen 12-channel, analog-to-digital integrators along a CAMAC serial highway. With each laser pulse, 212 channels of data are acquired: 106 channels of signal plus background and 106 channels of background only. Extensive use of CAMAC instrumentation enables large amounts of data to be acquired and control processes to be performed in a time-dependent environment. The Thomson-scattering computer system currently operates in three modes: user interaction and control, data acquisition and transmission, and data analysis. DOE

63 CYBERNETICS

Includes feedback and control theory.
For related information see also *54 Man/System Technology and Life Support.*

N83-30098# Illinois Univ., Urbana. Decision and Control Lab.
CHAINED AGGREGATION AND CONTROL SYSTEM DESIGN: A GEOMETRIC APPROACH Ph.D. Thesis
Douglas Kent Lindner Oct. 1982 189 p refs
(Contract N00014-79-C-0424; Grant AF-AFOSR-3633-78)
(AD-A125853; DC-56; UILU-ENG-82-2232; R-966) Avail: NTIS HC A09/MF A01 CSCL 12/1

This thesis is an indepth study of the Generalized Hessenberg Representation (GHR) of a linear time-invariant control system. It is shown that the GHR explicitly exhibits a sequence of observability subspaces. By studying these subspaces in this specific basis, a number of results follow. Having defined the subspace algebraically, the authors introduce a topology into the subspaces of state space. Using the GHR they are able to estimate distances between key subspaces. This leads to a measure of the degree of observability, called here near unobservability, which formalizes the intuitive geometric notion that a system is 'nearly unobservable' if it has an invariant subspace near the null space of C. The relationship to other measures of observability is discussed as well as its role in model reduction. GRA

N83-30099# Advanced Information and Decision Systems, Mountain View, Calif.
DISTRIBUTED DECISION MAKING ENVIRONMENT Interim Report, Jun. 1981 - Jun. 1982
J. M. Abram, C. Y. Chang, V. G. Rutenburg, E. Tse, and R. P. Wishner Griffiss AFB, N.Y. RADC Dec. 1982 163 p refs
(Contract F30602-81-C-0210; AF Proj. LDFP)
(AD-A126021; RADC-TR-82-310) Avail: NTIS HC A08/MF A01 CSCL 05/1

This report provides preliminary results on a distributed decision making environment. A computer implemented interactive planning environment is described, as are algorithms for automating decision making for a hypothetical Air Force scenario. A design methodology for structuring distributed decision making is also discussed. Author (GRA)

N83-30100# Illinois Univ., Urbana. Decision and Control Lab.
SINGULAR PERTURBATIONS AND TIME-SCALE METHODS IN CONTROL THEORY: SURVEY 1976-1982
V. R. Saksena (Bell Telephone Lab.), J. OReilly (Liverpool Univ.), and P. V. Kokotovic Dec. 1982 93 p refs
(Contract N00014-79-C-0424; Grant AF-AFOSR-3633-78)
(AD-A125908; UILU-ENG-82-2245; DC-58; R-979) Avail: NTIS HC A05/MF A01 CSCL 12/1

Recent progress in the use of singular perturbation and two time scale methods of modeling and design for control systems is reviewed. Over 400 references are organized into major problem areas. Representative issues and results are discussed with a view to outlining research directions and indicating potential areas of application. The survey is aimed at engineers and applied mathematicians interested in model order reduction, separation of time scales and allied simplified methods of control system analysis and design. The exposition does not assume prior knowledge of singular perturbation methods. Author (GRA)

N83-30101# Wisconsin Univ., Madison. Dept. of Chemical Engineering.

MULTIVARIABLE INTERNAL MODEL CONTROL
Carlos E. Garcia and Manfred Morari 1982 59 p refs Presented at the Ann. Meeting of Heat Transfer and Energy Conversion, Los Angeles, 14 Nov. 1982
(Contract DE-AC02-80ER-10645)
(DE83-007320; DOE/ER-10645/9; CONF-821106-27) Avail: NTIS HC A04/MF A01

Although Pontryagin, Bellman and Kalman developed a revolutionary framework for the optimization of control system performance, only an insignificant number of applications to practical problems has taken place in the chemical process industries. Internal Model Control (IMC), whose fundamentals are described, can close this gap by offering as good a performance as can be achieved by an optimal controller in a package which is more transparent and therefore appealing to the practitioner. DOE

N83-30102# Oxford Univ. (England). Engineering Lab.
CASE-STUDIES IN DIRECT DIGITAL CONTROL OF STOCHASTIC SYSTEMS
O. L. R. Jacobs 1982 22 p refs
(Grant SRC-GR/B/77215)
(OUEL-1430/82) Avail: NTIS HC A02/MF A01

Discussions on case studies resulting from visits to 21 institutions are presented. Projects on feedback control in clinical medicine are included. Nonlinear estimation problems which arise in the case studies are discussed. Author (ESA)

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N83-30103# Mathematisch Centrum, Amsterdam (Netherlands).
AN ANALYSIS OF SPARSE MATRIX STORAGE SCHEMES
M. Veldhorst 1982 253 p refs
(MATH-CENTRE-TRACTS-150; ISBN-90-6196-242-0) Avail: NTIS HC A12/MF A01

The TORRIX library system, sparse matrices, complexity results for the consecutive ones property, approximation of the consecutive ones matrix augmentation problem, data structures for sparse matrices, optimal partitions of a sparse matrix in TORRIX-sparse, and suitability of TORRIX-sparse for symbolic LU decomposition. Author

N83-30104# Mathematisch Centrum, Amsterdam (Netherlands).
PROJECTIONS OF LAWLESS SEQUENCES Ph.D. Thesis - Amsterdam Univ.
G. F. vanderHoeven 1982 249 p refs
(MATH-CENTRE-TRACTS-152; ISBN-90-6194-244-7) Avail: NTIS HC A11/MF A01

Aspects of GC sequences and GC carriers, frames and nestings, projection models for GC (C), the ordering of restrictions and the overtake property, formal systems, the elimination theorem for domains, and the main theorem and its corrollaries are addressed. Author

N83-30105# Mathematisch Centrum, Amsterdam (Netherlands).
APPLICATION OF THE THEORY OF BOUNDARY VALUE PROBLEMS IN THE ANALYSIS OF A QUEUEING MODELING WITH PAIRED SERVICES Ph.D. Thesis - Utrecht Univ., 22 Sep. 1982
J. P. C. Blanc 1982 257 p refs
(MATH-CENTRE-TRACTS-153; ISBN-90-6196-247-1) Avail: NTIS HC A12/MF A01

Many characteristic quantities for the queueing model with two types of customers, Poisson arrival processes, paired services and general service time distribution are obtained after solving a functional equation by means of the formulation of a Hilbert boundary value problem. The transforms of the time dependent as well as those of the stationary distributions of these characteristic quantities were expressed in terms of a class of conformal mappings of the interior of smooth contours onto the unit disk and their inverse. Author

N83-30106*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
N-PERSON DIFFERENTIAL GAMES. PART 2: THE PENALTY METHOD Final Report
Goong Chen, Wendell H. Mills, Quan Zheng, and Wan-Hua Shaw Apr. 1983 55 p refs
(Contract NAS1-15810; Grant NSF MCS-81-01892)
(NASA-CR-166111; ICASE-83-8; NAS 1.26:166111) Avail: NTIS HC A04/MF A01 CSCL 12A

The equilibrium strategy for N-person differential games can be found by studying a min-max problem subject to differential systems constraints. The differential constraints are penalized and finite elements are used to compute numerical solutions. Convergence proof and error estimates are given. Numerical results are also included and compared with those obtained by the dual method. M.G.

N83-30107*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A PRECONDITIONED FORMULATION OF THE CAUCHY-RIEMANN EQUATIONS Final Report
Timothy N. Phillips Jun. 1983 16 p refs
(Contract NAS1-17070)
(NASA-CR-172156; ICASE-83-27; NAS 1.26:172156) Avail: NTIS HC A02/MF A01 CSCL 12A

A preconditioning of the Cauchy-Riemann equations which results in a second-order system is described. This system is shown to have a unique solution if the boundary conditions are chosen carefully. This choice of boundary condition enables the solution of the first-order system to be retrieved. A numerical solution of the preconditioned equations is obtained by the multigrid method. Author

N83-30108*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LEGENDRE-TAU APPROXIMATIONS FOR FUNCTIONAL DIFFERENTIAL EQUATIONS Final Report
Kazufumi Ito and Russell Teglas Jun. 1983 46 p refs
(Contract NAS1-17070)
(NASA-CR-172155; ICASE-83-17; NAS 1.26:172155) Avail: NTIS HC A03/MF A01 CSCL 12A

The numerical approximation of solutions to linear functional differential equations are considered using the so called Legendre tau method. The functional differential equation is first reformulated as a partial differential equation with a nonlocal boundary condition involving time differentiation. The approximate solution is then represented as a truncated Legendre series with time varying coefficients which satisfy a certain system of ordinary differential equations. The method is very easy to code and yields very accurate approximations. Convergence is established, various numerical examples are presented, and comparison between the latter and cubic spline approximations is made. Author

N83-30109*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
NUMERICAL SOLUTION OF A COUPLED PAIR OF ELLIPTIC EQUATIONS FROM SOLID STATE ELECTRONICS Final Report
Timothy N. Phillips Jan. 1983 21 p refs Sponsored in part by Science and Engineering Research Council, England
(Contract NAS1-17070)
(NASA-CR-172128; ICASE-83-1; NAS 1.26:172128) Avail: NTIS HC A02/MF A01 CSCL 12A

Iterative methods are considered for the solution of a coupled pair of second order elliptic partial differential equations which arise in the field of solid state electronics. A finite difference scheme is used which retains the conservative form of the differential equations. Numerical solutions are obtained in two ways, by multigrid and dynamic alternating direction implicit methods.

Numerical results are presented which show the multigrid method to be an efficient way of solving this problem. Author

N83-30110*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FINITE-DIFFERENCE, SPECTRAL AND GALERKIN METHODS FOR TIME-DEPENDENT PROBLEMS Final Report
Eitan Tadmor Jun. 1983 57 p refs
(Contract NAS1-17070)
(NASA-CR-172149; ICASE-83-22; NAS 1.26:172149) Avail: NTIS HC A04/MF A01 CSCL 12A

Finite difference, spectral and Galerkin methods for the approximate solution of time dependent problems are surveyed. A unified discussion on their accuracy, stability and convergence is given. In particular, the dilemma of high accuracy versus stability is studied in some detail. Author

N83-30111*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PRECONDITIONED MINIMAL RESIDUAL METHODS FOR CHEBYSHEV EQUATIONS Final Report
Claudio Canuto and Alfio Quarteroni Jun. 1983 34 p refs
(Contract NAS1-17070)
(NASA-CR-172157; ICASE-83-28; NAS 1.26:172157) Avail: NTIS HC A03/MF A01 CSCL 12A

The problem of preconditioning the pseudospectral Chebyshev approximation of an elliptic operator is considered. The numerical sensitiveness to variations of the coefficients of the operator are investigated for two classes of preconditioning matrices: one arising from finite differences, the other from finite elements. The preconditioned system is solved by a conjugate gradient type method, and by a DuFort-Frankel method with dynamical parameters. The methods are compared on some test problems with the Richardson method and with the minimal residual Richardson method. Author

N83-30112*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A COMPACT FINITE DIFFERENCE SCHEME FOR div(RHO grad u) - q2u = 0 Final Report
T. N. Phillips and M. E. Rose Jun. 1983 23 p refs
(Contract NAS1-17070)
(NASA-CR-172165; ICASE-83-26; NAS 1.26:172165) Avail: NTIS HC A02/MF A01 CSCL 12A

A representative class of elliptic equations is treated by a dissipative compact finite difference scheme and a general solution technique by relaxation methods is discussed in detail for the Laplace equation. Author

N83-30113*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FLUX-BASED ACCELERATION OF THE EULER EQUATIONS
Gary M. Johnson 1983 9 p refs Presented at the 6th Computational Fluid Dyn. Conf., Danvers, Mass., 13-15 Jul. 1983; sponsored by AIAA
(NASA-TM-83453; E-1767; NAS 1.15:83453) Avail: NTIS HC A02/MF A01 CSCL 12A

A new coarse grid acceleration scheme for the Euler equations is presented. This flux based scheme eliminates the need, exhibited by previous accelerators, for computing flux vector Jacobian matrices. The method is derived and implemented in a two dimensional flow algorithm. Numerical results are presented for both subcritical and shocked, supercritical flow. These results demonstrate that the flux based accelerator is more efficient than its Jacobian based counterpart. Generalization to three dimensions is immediate. Construction of flux based accelerators for the Navier-Stokes equations is also discussed. Author

N83-30114# Yale Univ., New Haven, Conn. Dept. of Computer Science.
MULTI-GOLD ALGORITHMS WITH APPLICATIONS TO ELLIPTIC BOUNDARY-VALUE PROBLEMS
Craig C. Douglas 1983 34 p refs
(Contracts N00014-82-K-0184; N00014-80-C-0076; Grant NSF MCS-81-06181)
(AD-A125769; RR-247) Avail: NTIS HC A03/MF A01 CSCL 12/1

This work is primarily concerned with solving the large sparse linear systems which arise in connection with finite-element or finite-difference procedures for solving self-adjoint elliptic boundary-value problems. These problems can be expressed in terms of abstract variational problems on Hilbert spaces. Our (multi-grid) schemes involve a sequence of auxiliary finite-dimensional spaces which do not have to be nested. We approximate the solution using the largest (finite-dimensional) space. These schemes are recursive in nature: they combine smoothing iterations in a space with solving one or more correction problems using smaller spaces. Under certain circumstances, the solution to a problem can be approximated well using smaller spaces. Since the smaller spaces are required to have geometrically fewer unknowns than the largest space, the savings in computation can be substantial. Our general theory is discretization independent and can be applied to problems which do not arise from partial differential equations. As examples, we consider three particular discretizations of variable coefficient self-adjoint second order elliptic boundary-value problems. The first is a finite-element discretization on a convex domain in two dimensions. The second is a finite-difference discretization in one dimension. The last is a finite-difference discretization on the unit square. GRA

N83-30115# Michigan Univ., Ann Arbor. Systems Engineering Lab.
HIGH-PERFORMANCE BANDED AND PROFILE EQUATION SOLVERS FOR THE CRAY-1. PART 1: THE UNSYMMETRIC CASE Interim Report
D. A. Calahan 1 Feb. 1982 59 p refs
(Grant AF-AFOSR-0158-80; AF Proj. 2304)
(AD-A125561; SEL-160; AFOSR-83-0078TR) Avail: NTIS HC A04/MF A01 CSCL 12/1

This report describes algorithms, performance, applications, and user information associated with two equation-solving codes for the CRAY-1: (1) Solution of a single banded matrix equation, unsymmetric in value but symmetric in structure; (2) Solution of a single profile matrix equation, unsymmetric in value and in structure. Both solvers assume that the matrix is main-memory resident. The former partitions the matrix internally to achieve high performance. The latter requires a user-supplied blocking of the LU structure, an inconvenience compensated by higher performance in solution of finite difference and a finite element grids. These codes are available as part of a library of CAL-coded equation-solvers. The mathematical software described herein is the result of experimental research on vector algorithms for the direct solution of 2-D (two dimensional) finite difference and finite element grids. The latter code represents what is thought to be the best compromise between vectorizability, sparsity exploitation, and user convenience for such problems for the CRAY-1. GRA

N83-30116# Maryland Univ., College Park. Computer Vision Lab.
ON THE CHARACTERIZATION OF SIMPLE CLOSED SURFACES IN 3-DIMENSIONAL DIGITAL IMAGES
George M. Reed Sep. 1982 26 p refs
(Grant AF-AFOSR-3271-77; AF Proj. 2304)
(AD-A125573; TR-1214; AFOSR-83-0069TR) Avail: NTIS HC A03/MF A01 CSCL 09/2

This is a continuation of a series of papers on the digital geometry of three-dimensional digital images. In earlier reports, D. Morgenthaler and A. Rosenfeld gave symmetric definitions for simple surface points under the concepts of 6-connectivity and 26-connectivity, and they non-trivially characterized a simple closed surface (i.e., a subset of the image which separates its complement into an inside and an outside) as a connected collection of orientable simple surface points. Later, the author and A. Rosenfeld established that the computationally costly assumption of orientability is unnecessary for 6-connectivity by proving that orientability, a local property, is implicitly guaranteed within the (3x3x3)-

neighborhood definition of a 6-connected simple surface point. However, they also showed that no such guarantee exists for 26-connectivity. In this report, the author completes this investigation of simple closed surfaces by showing that orientability is ensured globally by 26-connectivity. Hence, a simple closed surface may be efficiently charactered as a connected collection of simple surface points regardless of the type of connectivity in consideration. Author (GRA)

N83-30117# Illinois Univ., Urbana. Group for Applied Computation Theory.
A CRITIQUE AND AN APPRAISAL OF VLSI MODELS OF COMPUTATION
G. Bilardi, M. Pracchi, and F. P. Preparata Aug. 1981 24 p refs
(Contract N00014-79-C-0424; Grant NSF MCS-81-05552)
(AD-A125835; ACT-28; UILU-ENG-81-2245; R-914) Avail: NTIS HC A02/MF A01 CSCL 12/1

The central question in the design and analysis of algorithms is the definition of the model of computation to be adopted. Indeed, performance becomes meaningful only in relation to a given model. This model is normally the simplified abstraction of a class of real or imaginary machines; for example, the RAM or Random-Access-Machine, is the model of practically the totality of existing (Von Neumann type) processors. The model of computation is the simplest possible, compatibly with the requirement of being realistic. In other words, while a model aims at capturing the essential traits of a system or technology, its simplicity is what enables theoretical appraisals of performance. In this paper the author evaluate various proposed VLSI models of computation. While there is consensus on the appraisal of chip area, controversy remains with regard to computation time. Thus they have analyzed in detail the propagation of signals on dispersive lines. The results are expressed in terms of a dimensional parameters characteristic of any given fabrication technology. The conclusion is that both current and projected silicon technologies fall within the realm of the capacitive model, where a dispersive line can be replaced by a capacitance proportional to its length. GRA

N83-30118# Illinois Univ., Urbana. Decision and Control Lab.
TIME SCALES, COHERENCY, AND WEAK COUPLING Ph.D. Thesis
Bozidar Avramovic Oct. 1980 143 p refs
(Contracts N00014-79-C-0424; EX-76-C-01-2088; Grant NSF ECS-79-19396)
(AD-A125845; DC-40; UILU-ENG-80-2227; R-895) Avail: NTIS HC A07/MF A01 CSCL 12/1

In this thesis the authors study a relation between time scales and structural properties of a class of systems represented by power systems. First, the time scale decomposition of linear time invariant systems is studied. The properties of the time scale decomposition are shown to be defined by properties of solutions of a generalized matrix Riccati equation. Use of the Riccati equation formulation and a particular method for finding its solution led to the result which shows that the singular perturbation method and modal method for reduced order modeling are two extreme points of an iterative method for the time scale decomposition: singular perturbation is its first point and modal method is the limiting point. Convergence properties of a known class of iterative methods for the time scale decomposition are characterized. A method for the time scale decomposition of weakly nonlinear systems is proposed as an extension of linear system analysis to nonlinear systems. Then, for electromechanical models power systems a connection between its time scales and structural properties is established by showing that the so-called slow coherency can be expressed in terms of the same Riccati equation used for the time scale decomposition. By using the Riccati formulation of coherency, an efficient numerical algorithm for identifying coherent areas is obtained. Finally, a possibility of extending this study to the direct transient stability analysis of power systems is briefly discussed. Author (GRA)

N83-30119# Illinois Univ., Urbana. Decision and Control Lab.
DECOMPOSITION OF TIME SCALES IN LINEAR SYSTEMS AND MARKOVIAN DECISION PROCESSES Ph.D. Thesis
Randolph Gale Phillips Nov. 1980 140 p refs
(Contract N00014-79-C-0424; Grant NSF ECS-79-19396)
(AD-A125852; DC-44; UILU-ENG-80-2237; R-902) Avail: NTIS HC A07/MF A01 CSCL 12/1

The presence of slow and fast dynamics in large scale systems has motivated the use of singular perturbations as a means of obtaining reduced order models for analysis and control law design. In this thesis the authors establish how system having this two-time-scale property can use singular perturbation modeling to make this property explicit enabling various reduced order analysis and design techniques to be applied. For deterministic linear time-invariant systems, various techniques for obtaining reduced order models are unified through left and right eigenspace decompositions. A general two stage control design procedure for separate fast and slow subsystems is developed which can be applied to both continuous and discrete time models. Finally, Markov chain models of stochastic systems with weak and strong transition probabilities lead to a singularly perturbed model from which is obtained the concept of the reduced order aggregate chain. For controlled Markov chains the aggregate model is used to develop decentralized optimization algorithms for the discounted and average cost per stage problems. GRA

N83-30120# Texas Univ., Austin. Center for Cybernetic Studies.
A SADDLE VALUE CHARACTERIZATION OF FAN'S EQUILIBRIUM POINTS
A. Charnes, K. O. Kortanek (Carnegie-Mellon Univ.), and V. Lovegren Oct. 1982 19 p refs
(Contract N00014-82-K-0295; Grant NSF ECS-80-26777)
(AD-A126237; CCS-413) Avail: NTIS HC A02/MF A01 CSCL 12/1

In this paper we develop a saddle value problem formulation for an equilibrium problem of Fan. Employing separably-infinite programming we give an equivalent dual pair of uniextremal problems for the purpose of making it easier to actually solve for the Fan equilibrium point. The uniextremal duality provides interpretations for the variables of each problem of the separably-infinite dual pair, even when they are not at their optimal values. The Fan equilibrium problem is basically a fixed point problem, and one establishes existence and uniqueness by other methods. Fixed point methods are certainly useful, perhaps even necessary for establishing existence, but it is difficult to obtain analytic information such as interpretations of the variables when they are not at their optimal values. GRA

N83-30121# Ohio State Univ., Columbus. Dept. of Geodetic Science and Surveying.
ON THE PERMANENCE PROPERTY IN SPHERICAL SPLINE INTERPOLATION
Willi Freeden Hanscom AFB, Mass. AFGL Nov. 1982 94 p refs
(Contract F19628-82-K-0017; AF Proj. 7600)
(AD-A126263; AFGL-TR-82-0386; REPT-341; SR-1) Avail: NTIS HC A05/MF A01 CSCL 12/1

Spherical spline functions are introduced by use of Green's (surface) functions with respect to the Beltrami operator on the sphere. The method of interpolation by spherical splines is formulated as variational problem of minimizing a (Sobolev) energy norm under interpolatory constraints. The process is constructed so as to have the so-called performance property, i.e., the transition from the interpolating spline with respect to N data to the interpolating spline with respect to N + 1 data necessitates merely the addition of one more term, all the terms obtained formerly remaining unchanged. The algorithm is numerically stable and very economical as regards the number of operations. GRA

N83-30122# Georgia Inst. of Tech., Atlanta. Production and Distribution Research Center.
A MINIMAL TECHNOLOGY ROUTING SYSTEM
John J. Bartholdi, III, Loren K. Platzman, R. Lee Collins, and William

H. Warden, III Jan. 1983 21 p refs
(Contract N00014-80-K-0709)
(AD-A126079; PDRC-83-01) Avail: NTIS HC A02/MF A01 CSCL 12/1

This describes the successful implementation of a novel routing system based on a new travelling salesman heuristic by the first two authors. The application called for the efficient daily routing of a varying number of vehicles to more than 200 delivery points whose locations change at a rate of about 14% each month. The system had to be easily maintained by one person and require no resources (e.g., no computer). This system achieved all of these objectives, cost less than $50, and, moreover, shortened average travel times by 13% compared to previous performance.
Author (GRA)

N83-30123*# Stanford Univ., Calif. Dept. of Computer Science.
STABILITY ANALYSIS OF FINITE DIFFERENCE SCHEMES FOR THE ADVECTION-DIFFUSION EQUATION
Tony F. Chan (Yale Univ.) Jan. 1983 21 p refs
(Contracts NCA2-OR745-702; N00014-75-C-1132; Grant NSF MCS-77-02082)
(NASA-CR-172823; NAS 1.26:172823; AD-A126082; SU-NA-83-01) Avail: NTIS HC A02/MF A01 CSCL 12A

We present a collection of stability results for finite difference approximations to the advection-diffusion equation sub ut = a sub ux + b sub uxx. The results are for centered difference schemes in space and include explicit schemes in time up to fourth order and schemes that use different space and time discretizations for the advective and diffusive terms. The results are derived from a uniform framework based on the Schur-Cohn theory of simple von Neumann Polynomials and are necessary and sufficient for the stability of the Cauchy problem. Some of the results are believed to be new. Author (GRA)

N83-30124# Naval Postgraduate School, Monterey, Calif. Dept. of Computer Science.
THE STRUCTURE OF DIVIDE AND CONQUER ALGORITHMS
Douglas R. Smith 4 Mar. 1983 41 p refs Submitted for publication
(RR00001100)
(AD-A126086; NPS52-83-002) Avail: NTIS HC A03/MF A01 CSCL 12/1

The structure of divide and conquer algorithms is represented by program schemes which provide a kind of normal-form for expressing these algorithms. A theorem relating the correctness of a divide and conquer algorithm to the correctness of its subalgorithms is given. Several strategies for designing divide and conquer algorithms for sorting a list of numbers, evaluating a propositional formula, and forming the cartesian product of two sets. Author (GRA)

N83-30125# Georgia Inst. of Tech., Atlanta. Center for Production and Distribution Research.
SPACEFILLING CURVES AND ROUTING PROBLEMS IN THE PLANE
Loren K. Platzman and John J. Bartholdi, III 11 Feb. 1983 54 p refs
(Contract N00014-80-K-0709)
(AD-A126309; PDRC-83-02) Avail: NTIS HC A04/MF A01 CSCL 12/1

This paper introduces a novel heuristic to compute a minimal-length tour of N given points in the plane: they are sequenced as they appear along a spacefilling curve. The algorithm consists essentially of sorting: it is easily coded, requires only O (N) memory, and may be implemented to execute in O (N log N) operations at most, or O (N) operations on the average. GRA

N83-30126# Illinois Univ., Urbana. Coordinated Science Lab.
TOPICS IN ROBUST STATISTICAL SIGNAL PROCESSING Ph.D. Thesis
Kenneth Steven Vastola Sep. 1982 111 p refs
(Contracts N00014-79-C-0424; N00014-81-K-0014; Grant NSF ECS-79-16453)
(AD-A125931; R-965; UILU-ENG-82-2231) Avail: NTIS HC A06/MF A01 CSCL 12/1

This dissertation addresses several problems in robust signal processing. The term robust in this context implies insensitivity to small deviations from the assumed statistical description of the signal and/or noise. The first part of this thesis considers the problem of linear minimum-mean-square-error estimation of a stationary signal observed in additive stationary noise when knowledge of the signal spectrum and noise spectrum is inexact. In the second part of this dissertation, a previously developed cohesive theory of robust hypothesis testing in which uncertainty is modeled via 2-alternating Choquet capacity classes is considered in light of recent applications of this theory to problems in robust signal processing and communication theory. GRA

N83-30127# Michigan Univ., Ann Arbor. Lab. for Systems Engineering.
HIGH-PERFORMANCE BANDED EQUATION SOLVER FOR THE CRAY-1. PART 2: THE SYMMETRIC CASE Interim Report
D. A. Calahan 1 Oct. 1982 22 p refs
(Grant AF-AFOSR-0158-80; AF Proj. 2304)
(AD-A125560; AFOSR-83-0079TR; SEL-166) Avail: NTIS HC A02/MF A01 CSCL 12/1

This report describes algorithms, performance, applications, and user information associated with a code which solves a memory-resident single banded symmetric matrix equation on the CRAY-1. The code is available as part of a library of CAL-coded equation-solvers. The mathematical software described herein is the result of experimental research on vector algorithms for the direct solution of finite element grids arising in structural analysis. It represents what is thought to be the best compromise between vectorizability, sparsity exploitation, and user convenience for such problems for the CRAY-1. Author (GRA)

N83-30128# Lincoln Lab., Mass. Inst. of Tech., Lexington.
OBJECT DETECTION BY TWO-DIMENSIONAL LINEAR PREDICTION
T. F. Quatieri 26 Jan. 1983 68 p refs
(Contract F19628-80-C-0002; AF Proj. 4594)
(AD-A126340; ESD-TR-82-109; TR-632) Avail: NTIS HC A04/MF A01 CSCL 12/1

An important component of any automated image analysis system is the detection and classification of objects. In this report, the authors consider the first of these problems where the specific goal is to detect anomalous areas (e.g., man-made objects) in textured backgrounds such as trees, grass, and fields of aerial photographs. Their detection algorithm relies on a significance test which adapts itself to the changing background in such a way that a constant false alarm rate is maintained. Furthermore, this test has a potentially practical implementation since it can be expressed in terms of the residuals of an adaptive two-dimensional linear predictor. The algorithms is demonstrated with both synthetic and real-world images. GRA

N83-30129# Utah Univ., Salt Lake City. Dept. of Mathematics.
THE S-MATRIX AND ACOUSTIC SIGNAL STRUCTURE IN SIMPLE AND COMPOUND WAVEGUIDES Technical Summary Report
Calvin H. Wilcox Dec. 1982 43 p refs
(Contract N00014-76-C-0276)
(AD-A125583; TSR-45) Avail: NTIS HC A03/MF A01 CSCL 12/1

This paper deals with the propagation of transient acoustic fields in waveguides that consist of a semi-infinite cylinder coupled to a resonant cavity or resonator. The walls of the waveguide are assumed to be rigid. The sources of the transient sound fields, or signals, are assumed to be localized in a bounded portion of the waveguide and to act for a finite interval of time. The goal of the work is to calculate such acoustic signals and to analyze how their structure depends on the sources and the geometry of the waveguide. Particular attention is given to the cases in which the signal sources or observation point, or both, lie in the cylinder and are far from the resonator. It is well known that in the

cylindrical portion of the waveguide each signal can be decomposed into a series of modal waves. These waves are calculated and are shown to be asymptotically independent for large times. GRA

N83-30130# Naval Research Lab., Washington, D. C.
TABLES OF SPHERICAL BESSEL FUNCTIONS OF THE FIRST AND SECOND KINDS FOR COMPLEX ARGUMENTS
Jean C. Piquette 1 Mar. 1983 46 p refs
(SF11121604)
(AD-A125876; NRL-MR-4992) Avail: NTIS HC A03/MF A01 CSCL 12/1

Tables of values of the spherical Bessel functions of the first and second kinds of complex argument are provided. Although these tables are not extensive, they are useful for checking the validity of computer routines that calculate spherical Bessel functions. A description of the method of computation is provided and verification procedures used are presented. GRA

N83-30131# Ecodynamics Research Associates, Inc., Albuquerque, N. Mex.
DEVELOPMENT OF THE GEM (GENERAL ELLIPTIC MARCHING) PACKAGE: USER-ORIENTED CODES FOR GENERAL DISCRETIZED ELLIPTIC AND MIXED PARTIAL DIFFERENTIAL EQUATIONS Final Report, 20 sep. 1979 - 19 Sep. 1982
Patrick J. Roache 18 Feb. 1983 18 p refs
(Contract DAAG29-79-C-0214)
(AD-A125897; ARO-16561.6-MA) Avail: NTIS HC A02/MF A01 CSCL 09/2

The development and testing of the GEM (general elliptic marching) codes is described. The GEM codes solve elliptic and mixed discretized 2D pde's by direct (non-iterative) spatial marching methods, in as few as 2 SOR iterations. Both 5-point and 9-point stencils may be solved, with no requirement that the coefficients be separable, and quite general boundary conditions are allowed. Also described is the use of Symbolic Manipulation to produce FORTRAN coding of the 2D and 3D stencils for boundary fitted coordinate problems, and validation methods. Author (GRA)

N83-30132# Texas Univ., Austin. Dept. of Mathematics.
REPRESENTATION OF MULTIVARIATE FUNCTIONS Final Report, 1 Jul. 1980 - 31 Oct. 1982
E. W. Cheny 14 Feb. 1983 7 p refs
(Contract DAAG29-80-K-0039)
(AD-A125898; ARO-16952.4-MA) Avail: NTIS HC A02/MF A01 CSCL 12/1

This research project concerned the general problem of how to represent (exactly or approximately) a given mathematical function of several real variables. Scientific computations often involve multivariate functions (i.e., functions of several variables). For efficiency in computing, these functions must be represented in a form which can be rapidly computed (to whatever precision is demanded by the task at hand). This usually means that the given function will be replaced by an easily-computed approximate function. Once an appropriate form has been selected for the approximating function, the task of determining the best function of that form arises. Also there are questions of existence of best approximations. Author (GRA)

N83-30133# Georgia Inst. of Tech., Atlanta.
LOCALLY ONE DIMENSIONAL NUMERICAL METHODS FOR MULTI-DIMENSIONAL FREE SURFACE PROBLEMS Final Report, 1 Aug. 1979 - 31 Dec. 1982
Gunter H. Meyer Mar. 1983 10 p
(Contract DAAG29-79-C-0145)
(AD-A125902; ARO-16373.4-MA) Avail: NTIS HC A02/MF A01 CSCL 12/1

Research on the numerical solution of free boundary problems for partial differential equations with locally or sequentially one-dimensional methods has been supported by the U.S. Army Research Office through two consecutive 3-year research contracts. The time and resources provided have made it possible to develop a reasonably comprehensive mathematical theory and flexible numerical algorithms on which to base current computational methods and future research. During the first 3-year period, the method of fractional steps and the method of lines were applied to elliptic and parabolic free boundary problems. During the past three years work was directed toward demonstrating the flexibility of the method of lines for increasingly complex problems, on examining the behavior of certain ill-posed elliptic free boundary problems, and on establishing a mathematical theory for sequentially one-dimensional algorithms. Author (GRA)

N83-30134# Carnegie-Mellon Univ., Pittsburgh, Pa. Management Sciences Research Group.
SUBMODULAR SET FUNCTIONS, MATROIDS AND THE GREEDY ALGORITHM: TIGHT WORST-CASE BOUNDS AND SOME GENERALIZATIONS OF THE RADO-EDMONDS THEOREM
Michele Conforti and Gerard Cornuejols Jan. 1983 38 p refs
(Contract N00014-79-C-0340)
(AD-A124981; MSRR-487) Avail: NTIS HC A03/MF A01 CSCL 12/1

A solution with value at least 1/(1 + alpha) times the optimum value, where alpha is a parameter which represents the total curvature of Z is discussed. Another bound which generalizes the Rado-Edmonds theorem is given in terms of a greedy curvature of the set function. Unlike the first bound, this bound can prove the optimality of the greedy algorithm even in instances where Z is not additive. A third bound, in terms of the rank and the girth of X, unifies and generalizes the bounds (e-1)/e known for uniform matroids and 1/2 for general matroids. The performance of the greedy algorithm when X is an independence system instead of a matroid is analyzed. Author

N83-30135# Illinois Univ., Urbana. Dept. of Computer Science.
MULTIRATE LINEAR MULTISTEP METHODS FOR THE SOLUTION OF SYSTEMS OF ORDINARY DIFFERENTIAL EQUATIONS
Daniel R. Wells Jul. 1982 92 p refs
(Contract DE-AC02-76ER-02383)
(DE83-004259; UILU-ENG-82-1719; UIUCDCS-R-82-1093; COO-2383-0084) Avail: NTIS HC A05/MF A01

If a multirate initial value problem is solved using an ODE solver which is based on linear multistep methods, the local stepsize is selected to track the fastest component of the solution to within the error tolerance specified by the user. If the dependence of the slower components of the system on those which are faster is small, typically this results in the slower components of the computed solution being accurate to several more digits than the user requires. If the fast components of the solution are not strongly dependent on the slower, this additional accuracy is unnecessary. Moreover, since the time required for integration increases with the accuracy obtained and with the number of components being integrated, tracking the slower components so closely is also very inefficient. Methods designed specifically to integrate multirate systems are considered. These methods are based on the usual linear multistep methods but instead of integrating all of the components at every time step, the slower components of the system are integrated less frequently. DOE

N83-30136# Sandia Labs., Albuquerque, N. Mex. Numerical Mathematics Div.
GLOBAL-ERROR ESTIMATION FOR STIFF ODES
Lawrence F. Shampine Dec. 1982 13 p refs
(Contract DE-AC04-76DP-00789)
(DE83-006846; SAND-82-2517) Avail: NTIS HC A02/MF A01

A method for estimating the global error when solving stiff ODEs is discussed. Undoubtedly the most popular codes for the solution of stiff ODEs are based on the backward differentiation formulas (BDF). The scheme described applies to the BDF of orders 1 to 3 but not to orders 4 to 6. Finally, an approximation made by Prothero is drawn upon to extend the applicability of the procedure, and in some cases to improve the accuracy of the procedure. DOE

N83-30137# Missouri Univ., Columbia. Dept. of Physics and Astronomy.
NON-SELF-ADJOINT INVERSE SPECTRAL THEORETIC DERIVATION OF A COMPLEX VON NUEMANN-WIGNER POTENTIAL
B. DeFacio 5 Nov. 1982 16 p refs Presented at the Symp. on Res. Techniques in Wave Propagation and Scattering, Columbus, Ohio, 18-21 Oct. 1982
(Contract W-7405-eng-82)
(DE83-009064; IS-M-414; CONF-8210134-1) Avail: NTIS HC A02/MF A01

The von Neumann-Wigner potential is a Schroedinger equation potential which supports a positive energy point eigenvalue. The Kay-Moses form of the Gel'fand-Levitan (G-L) equation of inverse spectral theory is used to function g(r). A nonself adjoint generalization of the G-l equation is used to derive a complex generalization of this potential. Exact expressions are given for this potential, the discrete clarifying comment on some non-L2 pseudo-functions used to calculate (all) reflectionless potentials are given. DOE

N83-30138# Brown Univ., Providence, R. I. Div. of Engineering.
A RECURSIVE ESTIMATOR AND STABILITY OF A CLASS OF TIME VARYING DIFFERENCE EQUATIONS
J. M. Mocenigo and A. E. Pearson 1983 47 p refs
(Grant NSF ECS-81-11218)
(PB83-167213; NSF/ECS-82015) Avail: NTIS HC A03/MF A01 CSCL 12A

A recursive least squares estimation is developed in an identification observer format with the property that the need for estimating initial conditions is eliminated for time limited data. Estimators are developed that work with observed input/output data corrupted by deterministic, piecewise deerministic, or stochastic noise. Conditions are established for the asymptotic stability of a class of nonautonomous linear difference equations which apply to the deterministic recursive estimators. The simulations for the recursive identifier indicate that a valid estimator has been developed. Simulator experience has shown, however, that from a practical standpoint the estimator is more powerful in its deterministic or piecewise deterministic form than in either of its stochastic forms. GRA

N83-30139# Los Alamos Scientific Lab., N. Mex.
FINITE-ELEMENT APPROACH TO ANALYZING COUPLED THERMAL-HYDRAULIC PROBLEMS
J. G. Bennett, S. P. Girrens, G. E. Cort, A. L. Graham, and N. L. Johnson 1983 12 p refs Presented at the 3rd Intern. Conf. on Numerical Methods in Thermal Probl., Seattle, 1 Mar. 1983
(Contract W-7405-eng-36)
(DE83-007565; LA-UR-83-519; CONF-830320-1) Avail: NTIS HC A02/MF A01

The finite-element method is used to study thermal-hydraulic systems to determine the pressures and temperatures necessary to obtain an engineering description of a convecting fluid. The fluid-motion formulation utilizes nonlinear flow-resistance coefficients based on experimentally determined relationships associating the hydraulic gradient and velocity field for steady flows. The code developed may also be used in a noncoupled mode to perform either transient thermal analysis or steady laminar fluid flow. Problems analyzed demonstrating code applicability to engineering problems include target design in a proton accelerator, nonlinear free-surface porous flow, multi-layered convecting flow patterns observed in solar-pond simulation experiments, and convective flow/structural interaction in reactor-safety studies. DOE

N83-30140# Santa Clara Univ., Calif. School of Engineering.
THE INCLUSION PRINCIPLE FOR DYNAMIC SYSTEMS Final Report, 1 Sep. 1977 - 30 Apr. 1982
D. D. Siljak, M. Araki, M. Ikeda, Lj. B. Jocic, R. Krtolica, G. S. Ladde, M. Mohsen-Metwally, V. Pichai, M. Ribbens-Pavella, and H. Selbuz May 1982 171 p refs
(Contract DE-AS03-77ET-29138)
(DE83-006412; DOE/ET-29138/T1) Avail: NTIS HC A08/MF A01

The notion of coordinate transformations in dynamic systems is generalized by geometric means to include changes in the order of a system. A Principle of Inclusion is formulated to study the geometric properties which are invariant under such transformations. The specific objective is to consider an unorthodox decomposition of dynamic systems in which the subsystems have parts in common. Using the order effective transformations, the system is expanded into a higher order system in which the overlapping subsystems appear as disjoint. Standard techniques based on disjoint decompositions can be used to extract from the expanded system the information about the motion and performance of the original system. These generalized control problems in which a limited information sharing among the various decision makers (controllers) is absolutely essential. The notion of inclusion is extended to incorporate performance indices, admitting the overlapping decomposition into the body of classical disjoint decomposition and decentralized control theory as it applies to the LQG optimization problems. DOE

N83-30141# Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Pure Mathematics.
A FINITE FLAG-TRANSITIVE GEOMETRY OF EXTENDED G2-TYPE
Bruce N. Cooperstein Aug. 1982 11 p refs Submitted for publication
(MC-ZW-176/82) Avail: NTIS HC A02/MF A01

An explicit construction of a finite flag-transitive geometry of the kind of geometries that are almost buildings (GAB) is given. It is characterized by an extended G2 diagram having the group G2(3) as automorphism group. The geometries of G2-type and the geometry of nonisotropic points in three dimensional unitary space are defined. The octaves and the G2 generalized hexagon and the construction of the extended G2 geometry of order 2 are discussed. It is shown that in the present case the intersection property is satisfied. Author (ESA)

N83-30142# Technische Hogeschool, Delft (Netherlands). Dept. of Mathematics and Informatics.
SURVEY OF SOME RESULTS FROM THE THEORY OF STOCHASTIC APPROXIMATIONS WITH A VIEW TO SYSTEM IDENTIFICATION
J. A. vanGelderen 1982 20 p refs
(PB83-161943) Avail: NTIS HC A02/MF A01 CSCL 12A

It is known that recursive identification algorithms are related to stochastic approximation algorithms. The latter have been introduced in mathematical statistics thirty years ago and have since been studied rather extensively. In this report, a survey is given of some results or the convergence and asymptotic distribution of stochastic approximation algorithms that are relevant to the analysis of recursive identification algorithms. GRA

N83-30143# Technische Hogeschool, Delft (Netherlands). Dept. of Electrical Engineering.
LEAST-SQUARE ITERATIVE TECHNIQUE FOR SOLVING TIME-DOMAIN SCATTERING PROBLEMS
Gerard C. Herman and Peter M. vandenBerg Jan. 1982 33 p refs
(PB83-164913) Avail: NTIS HC A03/MF A01 CSCL 12A

An alternative method for the numerical solution of time domain integral equations pertaining to three dimensional transient scattering problems is developed and applied to two representative acoustic scattering configurations. It is based on the iterative minimization of air integrated square error. For the cases considered, the method gives more accurate results than the frequently used marching on in time method (within comparable computation times). Author (GRA)

N83-30144# Groningen Rijksuniversiteit (Netherlands). Mathematics Inst.
QUASI PERIODICITY IN LOCAL BIFURCATION THEORY
H. W. Broer Sep. 1982 34 p refs
(PB83-165092; ZW-8204) Avail: NTIS HC A03/MF A01 CSCL 12A

The paper presents an overview of some results obtained recently in the local theory of bifurcations of dynamical systems, which are concerned with quasi periodic flow. With this local theory we here mean the qualitative (topological) behavior of parametrized systems of ordinary differential equations near equilibrium points, especially the changes in this behavior as the parameters move. The results of this paper involve some techniques, connected with so called small divisions which come from the Kolmogorov-Arnold-Moser theory into this field of bifurcations. Although these techniques found their origin in Hamiltonian dynamics (celestial mechanics, stability of the solar system), it is by now well known that their scope of applicability is much wider. Author (GRA)

N83-30145# Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering.
COMPARISON OF LINEAR AND NONLINEAR RANDOM FIELD ESTIMATORS
Carlos Enrique Puente Angulo and Rafael L. Bras Nov. 1982 249 p refs
(Grants NSF CME-79-19836; NSF G5-105071)
(PB83-169755; NSV/CEE-82085) Avail: NTIS HC A11/MF A01 CSCL 12A

The theoretical and practical aspects of Linear and Nonlinear (Disjunctive) Kriging estimators of random phenomena are presented and their performance in estimating point values and areal averages is compared. Advantages and disadvantages of the Linear and Disjunctive Kriging estimators are explored when they are calculated using the number of data points and spatial structures found in hydrological applications. The theoretical basis and definition of the Linear Kriging estimator are given under different assumptions about the data sets. The theory of Intrinsic Random Functions and the practical estimation of generalized covariances are reviewed. Results of experiments made to compare performance on block estimation are given. GRA

N83-30146# Instituut TNO voor Wiskunde, Informatieverwerking en Statistiek, The Hague (Netherlands).
NON-LINEAR REGRESSION M.S. Thesis
B. Engel Nov. 1982 186 p refs
(PB83-167643) Avail: NTIS HC A09/MF A01 CSCL 12A

The following areas were addressed: unconstrained minimization; optimization under constraints; asymptotic behavior of the least squares estimators; construction of tests and confidence sets; and analysis of residuals. GRA

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N83-30147# Mathematisch Centrum, Amsterdam (Netherlands).
HIGHER ORDER ASYMPTOTICS FOR SIMPLE LINEAR RANK STATISTICS Thesis
R. J. M. M. Does 1982 104 p refs
(MATH-CENTRE-TRACTS-151; ISBN-90-6196-243-9) Avail: NTIS HC A06/MF A01

Berry-Esseen theorems under the null hypothesis, Edgeworth expansions under the null hypothesis, and asymptotic expansions under contiguous alternatives are addressed. Author

N83-30148# Stanford Univ., Calif. Dept. of Statistics.
MOMENTS OF THE MINIMUM OF A RANDOM WALK AND COMPLETE CONVERGENCE
Michael Hogan Jan. 1983 18 p refs
(Contract N00014-77-C-0306)
(AD-A125768; SU-TR-21) Avail: NTIS HC A02/MF A01 CSCL 12/1

Let S sub n be a random walk with positive drift. Let S(min) = inf(n>o) [S sub n]. A new proof is given for the following: for p> or = 1 E absolute value of S(min)(p) < infinity < = > E(absolute value of S sub 1(p+1) 1 sub S sub (1<o)) < infinity. Related results are discussed. Author

N83-30149# Stanford Univ., Calif. Dept. of Statistics.
SELECTING REPRESENTATIVE POINTS IN NORMAL POPULATIONS
S. Iyengar and H. Solomon 14 Jan. 1983 18 p refs
(Contract N00014-76-C-0475)
(AD-A125770; SU-TR-330) Avail: NTIS HC A02/MF A01 CSCL 12/1

Quantization of the univariate normal arises in a number of applications. One seeks an optimal set of representative points and a number of investigators have written on this problem and prepared tables. In this paper we explore some special cases in two and three dimensions employing mean square error as a loss function. Results are given for these special multivariate situations. Author (GRA)

N83-30150# Desmatics, Inc., State College, Pa.
THE EFFECT OF ENVIRONMENTAL CHANGE IN SINGLE-SUBJECT EXPERIMENTS
Kevin C. Burns and Dennis F. Smith Feb. 1983 28 p refs
(Contract N00014-79-C-0128)
(AD-A125779; TR-112-12) Avail: NTIS HC A03/MF A01 CSCL 12/1

Statistical procedures for testing the mean of a first-order autoregressive model are evaluated. Two types of test statistic are considered. One involves estimating the autocorrelation and using that estimate to transform the data. The second type of test statistic is of the form T/w, where w is a function of the estimated autocorrection and T = square root of n x the mean of Y/s. The usual estimation of the autocorrelation is used initially and compared to a revised estimator which provides less biased estimates. Each procedure is evaluated according to its performance on a set of simulated data. Author (GRA)

N83-30151# Kansas Univ., Lawrence. Dept. of Psychology.
CONFIDENCE ENVELOPES FOR MONOTONIC FUNCTIONS: PRINCIPLES, DERIVATIONS, AND EXAMPLES Interim Report, Jul. - Dec. 1981
David Thissen and Howard Wainer (Educational Testing Service) Brooks AFB, Tex. AFHRL Mar. 1983 31 p refs
(Contract F41689-81-C-0012; AF Proj. 2313)
(AD-A126230; AFHRL-TP-82-37; ETS-T-254) Avail: NTIS HC A03/MF A01 CSCL 12/1

The bounds of plausible behavior for a multiparameter monotonic function can be expressed as a stochastic confidence envelope around the function. This paper presents the derivation of a general method for constructing such bounds. The bounds described are first specialized to the linear case, yielding results identical to known results found by other means. The method in the more general nonlinear case is then illustrated on three logistic item response models. GRA

N83-30152# Ballistic Research Labs., Aberdeen Proving Ground, Md.
EXACT PROBABILITY LEVELS FOR MULTISAMPLE SMIRNOV-TYPE STATISTICS
William E. Baker and Malcom S. Taylor Mar. 1983 148 p refs
(DA Proj. 1L1-61102-AH-43)
(AD-A126104; AD-F300210; ARBRL-TR-02477) Avail: NTIS HC A07/MF A01 CSCL 12/1

Let there be given c independent random samples of continuous random variables of size nl, n2, ... , nc; and denote the observations in the i th sample by xi1, xi2, ... , xini. Suppose it is desired to test the null hypothesis that the samples all come from the same population. Birnbaum and Hall proposed for this null hypothesis the test statistic D(n1,n2,...,nc)-Sup / Fi*(x) -Fj*(x) / fc, i, j - 1,2, ..., c, where Fi* denotes the empirical cumulative distribution function for the i th sample. In their 1960 paper they published the probabilities P/D(n,n,n)<r/ for n - 1(1)20(2)40 where r = k/n, k = 1,2, ..., n. The tables appearing here are an extension of the Birnbaum-Hall tables, resulting from the examination of a

larger number of samples and the consideration of unequal sample sizes. In addition, an application of this work to a problem in ballistics is discussed. GRA

N83-30153# Rio Grande Associates, Houston, Tex.
ON THE VARIANCE OF PROBABILITY ESTIMATES WITH CORRELATED DATA
Robert R. Beland Hanscom AFB, Mass. AFGL Nov. 1982 31 p refs
(Contract F19628-81-C-0128; AF Proj. 9993)
(AD-A126336; AFGL-TR-83-0040; SR-1) Avail: NTIS HC A03/MF A01 CSCL 12/1

The foundations for probability estimation are presented for random processes in discrete time. The estimators considered are the empirical distribution function and the amplitude histogram and conditions are given for these to be unbiased and consistent. Expressions for the variance and covariance of these estimators are presented and the effect of correlations on these quantities is discussed and demonstrated numerically by simulations. A theorem establishes a monotonic relation between the variance and the correlation for Gaussian processes. Author (GRA)

N83-30154# California Univ., Livermore. Lawrence Livermore Lab.
THE APPLICATION OF MONTE CARLO CODES TO NEUTRON DOSIMETRY
Charles T. Prevo 15 Jun. 1982 22 p refs Presented at the DOE Workshop on Personnel Neutron Dosimetry, Las Vegas, Nev., 24-25 Jun. 1982
(Contract W-7405-eng-48)
(DE82-017635; UCRL-87745; CONF-820668-2) Avail: NTIS HC A02/MF A01

In neutron dosimetry, calculations enable one to predict the response of a proposed dosimeter before effort is expended to design and fabricate the neutron instrument or dosimeter. The nature of these calculations requires the use of computer programs that implement mathematical models representing the transport of radiation through attenuating media. All of these techniques are either approximate solutions to the well known Boltzmann equation or are based on kernels obtained from solutions to the equation. The Boltzmann equation is a precise mathematical description of neutron behavior in terms of position, energy, direction, and time. The solution of the transport equation represents the average value of the particle flux density. Integral forms of the transport equation are generally regarded as the formal basis for the Monte Carlo method, the results of which can in principle be made to approach the exact solution. DOE

N83-30155# California Univ., Livermore. Lawrence Livermore Lab.
A REVIEW OF QUANTUM MONTE CARLO METHODS AND RESULTS FOR COULOMBIC SYSTEMS
D. Ceperley 27 Jan. 1983 12 p refs Presented at the Monte Carlo Methods in Quantum Probl. Conf., Paris, 29 Nov. - 3 Dec. 1982
(Contract W-7405-eng-48)
(DE83-006570; UCRL-88642; CONF-821166-1) Avail: NTIS HC A02/MF A01

The various Monte Carlo methods for calculating ground state energies are briefly reviewed. Then a summary of the charged systems that have been studied with Monte Carlo is given. These include the electron gas, small molecules, a metal slab and many-body hydrogen. DOE

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N83-30156# Texas Univ., Austin. Center for Cybernetic Studies.
EFFICIENT TREE HANDLING PROCEDURES FOR ALLOCATION/PROCESSING NETWORKS
Michael Engquist and Chou-Hong Chen Dec. 1982 22 p refs Sponsored in part by a grant from CBA Foundation
(Contracts N00014-81-C-0236; N00014-82-K-0295)
(AD-A126238; CCS-437) Avail: NTIS HC A02/MF A01 CSCL 12/2

Processing network problems are minimum-cost network flow problems in which the flow entering (or leaving) a node may be constrained to do so in given proportions. These problems include many practical large-scale linear programming applications. In this paper a special class of processing network problems called allocation/processing (AP) network problems is described. AP network problems model a realistic situation in which a single raw material is allocated to factories and the resulting finished products are distributed to customers. A special partitioning method (PPR algorithm) is introduced for the solution of AP network problems. This algorithm maintains a working basis as well as a so-called representative spannng tree. A method for updating the representative spanning tree is discussed which avoids tracing a number of cycles at each iteration. A FORTRAN implementation (PPRNET) of the PPR algorithm is described. Comparative computational results are presented for randomly generated AP network problems which were solved by PPRNET and MINOS. These results indicate that significant computational gains are possible with the use of special purpose processing network codes. Author (GRA)

N83-30157# Texas Univ., Austin. Center for Cybernetic Studies.
INVARIANT MULTIPLICATIVE EFFICIENCY AND PIECEWISE COBB-DOUGLAS ENVELOPMENTS
A. Charnes, W. W. Cooper, L. Seiford, and J. Stutz (Miami Univ.) Nov. 1982 9 p refs Prepared in cooperation with Carnegie-Mellon Univ.
(Contracts N00014-81-C-0236; MDA903-81-C-0365; F49642-82-C-0129)
(AD-A126239; CCS-441) Avail: NTIS HC A02/MF A01 CSCL 12/2

A new multiplicative efficiency formulation is developed wherein the efficiency values are invariant under changes in the units of measurement of outputs and inputs. It is shown that the associated Data Envelopment Analysis (DEA) implies that optimal envelopments are of piecewise Cobb-Douglas type. This leads to a new method for estimating frontier production functions of Cobb-Douglas type. GRA

N83-30158# Washington Univ., St. Louis, Mo. Dept. of Computer Science.
TOTAL SYSTEM DESIGN (TSD) METHODOLOGY ASSESSMENT Final Technical Report, Sep. 1980 - Sep. 1982
Gruia-Catalin Roman, M. J. Stucki, R. K. Israel, W. E. Ball, W. D. Gillett, S. V. Pollack, and J. T. Love Griffiss AFB, N.Y. RADC Jan. 1983 379 p refs
(Contract F30602-80-C-0284; AF Proj. 3205)
(AD-A126101; RADC-TR-82-331) Avail: NTIS HC A17/MF A01 CSCL 09/2

The report is concerned with the nature of and strategies involved in the identification of the hardware/software mix that comprises a distributed system. Current state-of-the-art in the areas of software engineering and hardware design/selection is consolidated under the unifying umbrella of a methodological framework called the Total System Design (TSD) Framework. A distributed systems design methodology, called the TSD Methodology, is proposed and illustrated in the context provided by two applications; ballistic missile defense and cartographic database. The methodology is derived from the framework but its scope is limited to the design activities that establish the overall architecture of the system and lead to the selection of a particular hardware/software mix which may include custom, customized, and off-the-shelf components. Plans for the development of a TSD Facility are also outlined in the report. The facility would make available an integrated set of tools for use in conjunction with the TSD Methodology and would provide a milieu for the development, evaluation and productive use of TSD technology. The report also includes a

guidebook describing the TSD concept in laymen terminology and several appendixes treating a variety of related topics. GRA

N83-30159# California Univ., Berkeley. Operations Research Center.
AN O(/E/) TIME ALGORITHM FOR COMPUTING THE RELIABILITY OF A CLASS OF DIRECTED NETWORKS
Avinash Agrawal and A. Satyanarayana Jun. 1982 34 p refs (Grant NSF ECS-81-15000)
(PB83-167197; ORC-82-7; NSF/ECS-82010) Avail: NTIS HC A03/MF A01 CSCL 12B

The problem of computing the source to terminal reliability, the probability that a source s can send communication to a terminal t, in a probabilistic directed network is discussed. A set of reliability preserving reductions, called 2 neighbor node reductions is introduced. It is shown that for a class of directed networks, called BSP digraphs, such reductions are always admissible and the source to terminal reliability can be computed in time linear in the size of the network. The BSP digraphs considered can be cyclic or acyclic and both vertices as well as edges can fail. Any two vertices can be chosen as s and t. No polynomial time algorithms were known previously for this class of digraphs. The proposed method is also applicable to mixed graphs containing directed and undirected edges. GRA

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

N83-30160# Institute for Basic Research, Cambridge, Mass. Div. of Physics.
HADRONIC PRESS MONOGRAPHS IN THEORETICAL PHYSICS, NO. 2. ADMISSIBLE APPROACH TO THE HADRONIC STRUCTURE. VOLUME 2: COVERING OF THE GALILEI AND EINSTEIN RELAVITIES?
Ruggero Maria Santilli Nonantum, Mass. Hadronic Press, Inc. Jul. 1982 331 p refs
(Contract DE-AC02-80-ER-10651)
(DE83-007251; DOE/ER-10651/T1-Vol-2) Avail: NTIS HC A15/MF A01

Topics covered include: Lie-admissible algebras; Birkhoff-admissible covering of Hamilton's and of Birkhoff's equations; Lie-admissible covering of Lie's theory; symplectic-admissible covering of symplectic geometry; and generalization of Galilei and Einstein special relativity for closed system with non-Hamiltonian internal forces. DOE

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N83-30161# Mitre Corp., McLean, Va.
HIGH-POWER GENERATION OF MICROWAVE AND INFRARED RADIATION
H. D. I. Abarbanel and J. M. Cornwall Feb. 1983 35 p refs
(AD-A125953; JSR-82-975) Avail: NTIS HC A03/MF A01 CSCL 20/8

An existing device, designed to explore astrophysical processes, emits high intensity broadband radiation into an angular cone of some 15 deg width. The total energy radiated in photons per 100 nsec beam pulse is approximately 100 J, at a wall plug efficiency of 0.1%. A single relativistic electron beam is used both to set up the plasma wave wiggler (via a two stream instability) and to radiate high frequency photons as in an FEL. It is suggested that two beams be used, roughly oppositely directed, and both interacting with a stationary plasma. The second beam of substantially slower velocity, can be either electrons or ions; its role is to set up the wiggler which then stimulates the relativistic electrons to radiate. This improves the kinematic control of photon emission, allowing both for higher frequencies and narrower angular spread of the radiation. Tactics are discussed for modulating the second beam so as to emphasize a narrow range of wiggler wavelengths. A.R.H.

N83-30162# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
CZECHOSLOVAK JOURNAL OF PHYSICS (SELECTED ARTICLES)
Vladimir Hermoch and B. H. Zitka 27 Jan. 1983 31 p refs Transl. into ENGLISH from Czechoslovak J. Phys. (Czechoslovakia), v. 3, no. 3, 1953 p 232-239, 241-254
(AD-A126183; FTD-ID(RS)T-1859-82) Avail: NTIS HC A03/MF A01 CSCL 05/2

One of the most widely used methods of electroerosion treatment is the so called anode mechanical method, which uses an electrolyte rather than a dielectric medium. The effect of the short term pulsed discharge, the effect of the surrounding electrolyte on the behavior of the discharge, and the effect of electromechanical changes on the surface of the electrode on the discharge mechanism were studied. B.G.

N83-30163# General Electric Co., Binghamton, N.Y. Aerospace Controls and Electrical Systems Dept.
MAGNETIZATION OF RARE EARTH/COBALT PERMANENT MAGNETS SUBSEQUENT TO ASSEMBLY IN COMPLEX ROTOR STRUCTURES Final Report, Jul. 1979 - Aug. 1981
Dinesh N. Taneja, R. C. Webb, and D. Lou Martin Wright-Patterson AFB, Ohio AFWAL Jun. 1982 95 p refs
(Contract F33615-79-C-2057; AF Proj. 3145)
(AD-A126322; AFWAL-TR-82-2086; AES-14001) Avail: NTIS HC A05/MF A01 CSCL 20/3

The object of this program was to demonstrate the feasibility of magnetizing large rare earth/cobalt permanent magnets subsequent to their assembly in complex rotor structures. A safe demagnetization (to near zero remanence) technique was optimized and demonstrated on individual magnets with insignificant detrimental affect on the magnet physical properties. Magnetic finite element analysis was completed which optimized the winding location requirements for the magnetization and substantiated that remagnetization of large rare earth/cobalt permanent magnets assembled in complex rotor structures is feasible if the magnetic field could be obtained. GRA

71 ACOUSTICS

Includes sound generation, transmission and attenuation. For noise pollution see *45 Environment Pollution*.

N83-30164*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THE WEDGE HOT-FILM ANEMOMETER IN SUPERSONIC FLOW
John M. Seiner May 1983 58 p refs
(NASA-TP-2134; L-15538; NAS 1.60:2134) Avail: NTIS HC A04/MF A01 CSCL 20A

A commercial wedge hot-film probe is studied to determine its heat transfer response in transonic to low supersonic flows of high unit Reynolds number. The results of this study show that its response in this flow regime differs from the response of cylindrical type sensors. Whereas the cylindrical sensor has the same sensitivity to velocity as to density for free-stream Mach numbers exceeding 1.3, the wedge probe sensitivity to velocity is always greater than its sensitivity to density over the entire flow regime. This property requires determination of three fluctuation components due to density, velocity, and temperature, in a transonic or supersonic turbulent flow. Sensitivity equations are derived based on the observed behavior of the wedge probe. Both the durability and the frequency response of the probe are excellent, the square wave insertion test indicting frequency response near 130 kHz. The directional response of the probe at sonic speed is poor and

requires further examination before Reynolds stress measurements are attempted with dual sensor probes. Author

N83-30165*# Bionetics Corp., Hampton, Va.
CHARACTERISTICS OF THE TRANSMISSION LOSS APPARATUS AT NASA LANGLEY RESEARCH CENTER
Ferdinand W. Grosveld Jun. 1983 43 p refs
(Contract NAS1-16978)
(NASA-CR-172153; NAS 1.26:172153) Avail: NTIS HC A03/MF A01 CSCL 20A

A descripton of the Transmission Loss Apparatus at NASA Langley Research Center, which is specifically designed to accommodate general aviation type aircraft structures, is presented. The measurement methodology, referred to as the Plate Reference Method, is discussed and compared with the classical method as described in the Standard of the American Society for Testing and Materials. This measurement procedure enables reliable and accurate noise transmission loss measurements down to the 50 Hz one-third octave band. The transmission loss characteristics of add-on acoustical treatments, applied to the basic structure, can be established by inclusion of appropriate absorption corrections for the treatment. Author

N83-30166*# Sikorsky Aircraft, Stratford, Conn.
DEVELOPMENT OF ROTORCRAFT INTERIOR. NOISE CONTROL CONCEPTS. PHASE 1: DEFINITION STUDY
C. A. Yoerkie, J. A. Moore, and J. E. Manning May 1983 211 p refs Prepared in cooperation with Cambridge Collaborative, Inc., Mass.
(Contract NAS1-16932)
(NASA-CR-166101; NAS 1.26:166101; SER-510126) Avail: NTIS HC A10/MF A01 CSCL 20A

A description of helicopter noise, diagnostic techniques for source and path identification, an interior noise prediction model, and a measurement program for model validation are provided. Author

N83-30167*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A FINITE DIFFERENCE SOLUTION FOR THE PROPAGATION OF SOUND IN NEAR SONIC FLOWS
S. I. Hariharan and Harold C. Lester Jul. 1983 29 p refs
(NASA-TM-84663; L-15635; NAS 1.15:84663) Avail: NTIS HC A03/MF A01 CSCL 20A

An explicit time/space finite difference procedure is used to model the propagation of sound in a quasi one-dimensional duct containing high Mach number subsonic flow. Nonlinear acoustic equations are derived by perturbing the time-dependent Euler equations about a steady, compressible mean flow. The governing difference relations are based on a fourth-order, two-step (predictor-corrector) MacCormack scheme. The solution algorithm functions by switching on a time harmonic source and allowing the difference equations to iterate to a steady state. The principal effect of the non-linearities was to shift acoustical energy to higher harmonics. With increased source strengths, wave steepening was observed. This phenomenon suggests that the acoustical response may approach a shock behavior at at higher sound pressure level as the throat Mach number aproaches unity. On a peak level basis, good agreement between the nonlinear finite difference and linear finite element solutions was observed, even through a peak sound pressure level of about 150 dB occurred in the throat region. Nonlinear steady state waveform solutions are shown to be in excellent agreement with a nonlinear asymptotic theory. Author

N83-30168*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
TURBULENCE SPECTRA IN THE NOISE SOURCE REGIONS OF THE FLOW AROUND COMPLEX SURFACES
William A. Olsen and Donald R. Boldman Jun. 1983 14 p refs
(NASA-TM-83392; E-1669; NAS 1.15:83392) Avail: NTIS HC A02/MF A01 CSCL 20A

The complex turbulent flow around three complex surfaces was measured in detail with a hot wire. The measured data include extensive spatial surveys of the mean velocity and turbulence intensity and measurements of the turbulence spectra and scale length at many locations. The publication of the turbulence data is completed by reporting a summary of the turbulence spectra that were measured within the noise source locations of the flow. The results suggest some useful simplifications in modeling the very complex turbulent flow around complex surfaces for aeroacoustic predictive models. The turbulence spectra also show that noise data from scale models of moderate size can be accurately scaled up to full size. Author

N83-30169# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
NUMERICAL CALCULATIONS OF ULTRASONIC FIELDS
J. A. Johnson Feb. 1982 142 p refs
(Contract DE-AC07-76ID-01570)
(DE82-013811; EGG-IS-5781) Avail: NTIS HC A07/MF A01

A code for calculating ultrasonic fields was developed by revising the thermal hydraulics code STEALTH. This code may be used in a wide variety of situations in which a detailed knowledge of a propagating wave field is required. Among the potential uses are interpretation of pulse echo or pitch catch ultrasonic signals in complicated geometries, ultrasonic transducer modeling and characterization; optimization and evaluation of transducer design; optimization and reliability of inspection procedures; investigation of the response of different types of reflectors; flaw modeling; and general theoretical acoustics. The code is described, and its limitations and potential are discussed. A discussion of the required input and of the general procedures for running the code is presented. Three sample problems illustrate the input and the use of the code. DOE

N83-30170# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
VERSATILE THREE-DIMENSIONAL HAMILTONIAN RAY-TRACING COMPUTER PROGRAM FOR ACOUSTIC WAVES IN THE ATMOSPHERE
R. M. Jones, J. P. Riley, and T. M. Georges Oct. 1982 244 p refs
(PB83-149930; NOAA-TM-ERL-WPL-103) Avail: NTIS HC A11/MF A01 CSCL 20A

A FORTRAN computer program for tracing the paths of acoustic waves in the atmosphere is described. The program integrates Hamilton's equations for a medium that can be anisotropic (because of wind) and varies continuously in three dimensions. Several versions of the subroutines that specify the spatial variation of wind velocity, sound speed, temperature, and molecular weight are provided; the user can specify other atmospheric models by writing new subroutines following the examples. For each path, the program can calculate group path (group time delay as an equivalent path length), phase as an equivalent path length, Doppler shift due to a time-varying atmosphere, and geometrical path length. In addition to printing these parameters and the direction of the wave normal at various points along the raypath, the program can plot the projection of the raypath on any vertical plane or on the ground and output the main characterisitcs of each ray in machine-readable form. The organization of the program into subroutines allows it to be applied to the propagation of waves in other media with straightforward modifications. GRA

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N83-30171*# Maryland Univ., College Park. Dept. of Physics and Astronomy.
CREATION OF HIGH ENERGY ELECTRON TAILS DUE TO THE MODIFIED 2-STREAM INSTABILITY Interim Report
Motohiko Tanaka and K. Papadopoulos Mar. 1983 16 p refs
(Grant NAGw-81; Contract N00014-79-C-0665)
(NASA-CR-172819; NAS 1.26:172819; AD-A126204; AF-83-048)

Avail: NTIS HC A02/MF A01 CSCL 20H

Particle simulations of the modified two-stream instability demonstrate strong electron acceleration rather than bulk heating when the relative drift speed Vd is below a critical speed Vc. A very interesting nonlinear autoresonance acceleration process is observed which accelerates the electrons much above the phase speed of the linearly unstable modes. Simple criteria are presented that predict the value of Vc and the number density of the accelerated electrons. Author (GRA)

N83-30172*# National Aeronautics and Space Administration, Washington, D. C.

PHOTOIONIZATION RESEARCH ON ATOMIC RADIATION. 3: THE IONIZATION CROSS SECTION OF ATOMIC NITROGEN

F. J. Comes and A. Elzer 24 Aug. 1982 10 p refs Transl. into ENGLISH from Z. fuer Naturforschung, Augsgabe A (USSR), v. 23a, no. 1, Jan. 1968 p 133-136 Previously announced as A68-20281 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3541)

(NASA-TM-77107; NAS 1.15:77107) Avail: NTIS HC A02/MF A01 CSCL 20H

The photoionization cross section of atomic nitrogen was measured between the ionization limit and 432 A. The experimental values are well fitted by those from a calculation of HENRY due to the dipole velocity approximation. A Rydberg series converging to the 5S-state of the ion is clearly identified from the ionization measurements and is shown to ionize. Author

N83-30173*# National Aeronautics and Space Administration, Washington, D. C.

PHOTOIONIZATION RESEARCH ON ATOMIC BEAMS. 2: THE PHOTOIONIZATION CROSS SECTION OF ATOMIC OXYGEN

F. J. Comes, F. Speier, and A. Elzer Aug. 1982 20 p refs Transl. into ENGLISH from Z. Naturforsch., A (West Germany), v. 23a, no. 1, Jan. 1968 p 125-133 Original language document announced as A68-20280 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Bonn Univ., Physical Chemistry Inst., West Germany

(Contract NASw-3541)

(NASA-TM-77106; NAS 1.15:77106) Avail: NTIS HC A02/MF A01 CSCL 20H

An experiment to determine the absolute value of the photoionization cross section of atomic oxygen is described. The atoms are produced in an electrical discharge in oxygen gas with 1% hydrogen added. In order to prevent recombination a crossed beam technique is employed. The ions formed are detected by a time-of-flight mass spectrometer. The concentration of oxygen atoms in the beam is 57%. The measured photoionization cross section of atomic oxygen is compared with theoretical data. The results show the participation of autoionization processes in ionization. The cross section at the autoionizing levels detected is considerably higher than the absorption due to the unperturbed continuum. Except for wavelengths where autoionization occurs, the measured ionization cross section is in fair agreement with theory. This holds up to 550 A whereas for shorter wavelengths the theoretical values are much higher. Author

N83-30174# SRI International Corp., Menlo Park, Calif.

DIAGNOSTICS DEVELOPMENT FOR E-BEAM EXCITED AIR CHANNELS. CONDUCTIVITY MEASUREMENTS IN AIR AFTERGLOWS Semiannual Technical Report

D. J. Eckstrom 4 Mar. 1983 51 p refs

(Contract N00014-81-C-0208; ARPA Order 4128)

(AD-A125997; SRI-MP-83-035; SATR-2) Avail: NTIS HC A04/MF A01 CSCL 20/9

Nonintrusive techniques for measuring conductivity decay in the afterglow air channel of a relativistic electron beam are reviewed, and the microwave cavity perturbation technique is found to offer adequate sensitivity. A right cylindrical cavity resonating in the TM 010 mode at 1.5 GHz was fabricated, and a series of preliminary measurements in air was performed. The afterglow conductivity of laboratory air at 1 amagat is apparently dominated by ions. The conductivities of synthetic air at 10 torr at 250 to 1500 microseconds after the pulse are consistent with electron densities of 10 to the 8th power to 5,000,000/cc and electron temperatures of approximately 0.15 eV. Surveys of conductivity histories at 5 pressures between 10 and 760 Torr are also reported. After the experimental set-up has been refined, conductivity studies in room temperature air will be repeated. Future work will include measurements on the ETA facility, measurements of shock-heated air, and measurements to investigate the field-induced detachment of negative ions in the afterglow. GRA

N83-30175# Harvard Univ., Cambridge, Mass.

MOLECULAR BEAM CHEMISTRY: REACTIONS OF OXYGEN ATOMS WITH HALOGEN MOLECULES Final Report, 1 Apr. 1978 - 30 Mar. 1981

D. D. Parrish, D. A. Dixon, and D. R. Herschbach Hanscom AFB, Mass. AFGL 15 Oct. 1982 72 p refs

(Contract F19628-78-C-0100; AF Proj. 2303)

(AD-A125870; AFGL-TR-82-0313) Avail: NTIS HC A04/MF A01 CSCL 07/4

Molecular beam experiments show that reactions of oxygen atoms with Br2, I2,IC1, and IBr proceed via long-lived collision complexes. In the mixed halogen case, a large yield of IO was found, but no ClO or BrO. These results suggest the intermediate complexes are unsymmetrical species, O-Br-Br, O-I-Cl, which are probably stable by greater than 20 kcal/mol and in triplet spin states. GRA

N83-30176# Naval Research Lab., Washington, D. C. Plasma Technology Branch.

VACUUM INDUCTIVE STORE/PULSE COMPRESSION EXPERIMENTS ON A HIGH POWER ACCELERATOR USING PLASMA OPENING SWITCHES Interim Report

R. A. Meger, R. J. Commisso, G. Cooperstein, and Shyke A. Goldstein 31 Mar. 1983 19 p refs Prepared in cooperation with JAYCOR, Inc., Alexandria, Va. Sponsored in part by the Defense Nuclear Agency

(AD-A126268; NRL-MR-5037) Avail: NTIS HC A02/MF A01 CSCL 20/8

A new type of an opening switch which operates in vacuum and opens on a nanosecond timescale at voltages $>$ 1 MV is described. This Plasma Opening Switch (POS) is able to conduct several hundred kiloamperes for approx. 50 nsec while a vacuum inductor is charged, then to open in $<$ 10 nsec, delivering a large fraction of the stored energy to an electron-beam load. Preliminary experiments are described and a simple model of the POS operations is presented. GRA

N83-30177# California Univ., San Diego, La Jolla.

MOLECULAR BEAM STUDIES OF LOW ENERGY REACTIONS Final Report, 1 Feb. 1981 - 31 Jan. 1983

R. H. Neynaber and S. Y. Tang 31 Mar. 1983 6 p refs

(Contract N00014-81-K-0255)

(AD-A126091) Avail: NTIS HC A02/MF A01 CSCL 07/4

Chemi-ionization and ion-molecule reactions involving metastable and ground-state atoms are studied by merging beams at low relative energies (i.e., 0.01 to 10 or 20 eV). Some theories exist for chemi-ionization involving collisions of metastable and ground-state rare gases. There is very little experimental data to test these theories over a range of relative kinetic energy from 0.01 to 10 or 20 eV. We will supply such data. Theoretical work for collisions between two metastables is almost non-existent, and experimental data are scant. We will supply experimental information such as absolute and relative cross sections and branching ratios for associative to Penning ionization. This information should establish patterns to test those calculations that do exist and will stimulate further theory. Our chemi-ionization data also will produce some information on unknown potentials for the systems A*B and C*D, where A, B, C, and D are atoms and asterisks denote metastables. This information includes well depths and the dependence of the long range potential on internuclear separation. GRA

N83-30178# Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.
THE AXISYMMETRIC INSTABILITY OF A SELF-PINCHED BEAM WITH A ROUNDED RADIAL DENSITY PROFILE
H. C. Chen and Han S. Uhm Dec. 1982 68 p refs
(ZR01109)
(AD-A126117; AD-F500141; NSWC/TR-83-14; PLASMA-PHYSICS-PUB-82-11) Avail: NTIS HC A04/MF A01 CSCL 20/7

The axisymmetric perturbations (sausage and Hollowing modes) of an intense relativistic self-pinched electron beam propagating in a resistive plasma background are studied, especially for a beam with rounded radial density profile. The Bennett profiles are assumed for both the equilibrium beam current J sub b(r)=J sub b(0)(1 + r to the second power/R to the second power sub b) to the - second power and plasma return current J sub p(r)=-fJ sub b(0)(1 + r to the second power/R to the second power sub p) to the - second power, where R sub b and R sub p are the characteristic radii of the beam and plasma return currents respectively. It is further assumed that the electric conductivity 0(r) of the plasma channel is proportional to the return current. For a paraxial electron beam with complete space-charge neutralization by the ambient plasma, the axisymmetric modes can be destabilized by the phase lag between the magnetic field and beam current, even without the plasma return current. The plasma return current significantly modifies the growth rate of the instability such that the ratio of plasma to beam current (-I sub p/I sub b=fR to the second power sub p/R to the second power sub b) largely determines the stability character of the beam. Furthermore, for the same fractional current neutralization f, the modes are highly unstable for smaller ratio of plasma to beam radius R sub p/R sub b. As comparing to the resistive hose instability, the growth rates for hollowing mode could be larger than those of hose mode, while the sausage mode is much stabler than the hose mode. Stability properties are illustrated in detail for various system parameters. GRA

N83-30179# Naval Research Lab., Washington, D. C.
IONIZING POTENTIAL WAVES IN PREIONIZED GASES Interim Report
R. F. Fernsler (JAYCOR, Inc.) 14 Mar. 1983 27 p refs
(ARPA Order 4395; RR0110941)
(AD-A126286; NRL-MR-5026) Avail: NTIS HC A03/MF A01 CSCL 20/8

A theory is presented to describe the advance of ionizing potential waves in preionized gases in nonuniform fields. The theory is based on the use of similarity and related arguments to bypass complicated mathematics and derive scaling relationships for wave speed as a function of applied potential and degree of ionization. For uniform preionization wave speed is predicted to scale linearly with applied potential and weaker than linearly with degree of preionization. These predictions are shown to agree well with recent potential-wave measurements obtained in electrical discharge studies using lasers to preionize meter-long paths in atmospheric air. Modifications due to radially confined preionization, particle drift, and electrode and other effects are also discussed. Author (GRA)

N83-30180# Wisconsin Univ., Madison. Dept. of Chemistry.
COLLISIONAL ENERGY TRANSFER IN HIGHLY VIBRATIONALLY EXCITED MOLECULES Summary Report, Jun. 1982 - May 1983
F. Fleming Crim 16 Mar. 1983 7 p
(Contract N00014-79-C-0415)
(AD-A126047) Avail: NTIS HC A02/MF A01 CSCL 20/8

Overtone vibration-laser double resonance measurements have provided new data on vibrational and rotational relaxation in HF(v = 2). These experiments determine the magnitudes of the total vibrational relaxation rate constants for HF(v= 1 and 2) as well as their temperature dependences. Rotational relaxation data come from these measurements as well. The temporal evolution of individual rotational states observed in the double resonance studies provides level-to-level energy transfer rate constants when analyzed using an iterative fitting scheme which incorporates scaling relations among the rate constants. GRA

N83-30181# RAND Corp., Santa Monica, Calif.
RAND DATA BASE OF SOVIET HIGH-CURRENT PARTICLE-BEAM R&D Interim Report
Simon Kassell Dec. 1982 18 p refs
(Contract MDA903-82-C-0067)
(AD-A125536; RAND/N-1949-ARPA) Avail: NTIS HC A08/MF A01 CSCL 05/1

Describes an automated data base that was established under the Rand project Analysis and Comparison of US/USSR Technology. The data base includes information extracted from some 90 Soviet technical journals specializing in physics, engineering, and related fields, and covers some 3000 technical reports and reviews originated by over 4000 authors, most of whom are affiliated with 65 research institutions. Reports may be generated from the data base by sorting the following variables in any combinations: author, institute, research team, primary subject, secondary subject, year of publication, and file card number. Author (GRA)

N83-30182*# Maryland Univ., College Park. Dept. of Physics and Astronomy.
SELECTIVE NON-RESONANT ACCELERATION OF 3He++ AND HEAVY IONS BY H+ CYCLOTRON WAVES Interim Report
H. Varvoglis (Thessaloniki Univ.) and K. Papadopoulos 3 Nov. 1982 18 p refs Submitted for publication
(Contracts NAGw-81; N00014-79-C-0665)
(NASA-CR-172820; NAS 1.26:172820; AD-A126185; AP83-057) Avail: NTIS HC A02/MF A01 CSCL 20H

The abundance anomalies associated with 3He-rich flares, are attributed to the intrinsically anomalous acceleration behavior of species with A/Q less than 3, in the presence of hydrogen cyclotron waves. While the overall model is along the lines of Fisk's (1978) proposal, the difficulties associated with triggering of nonhydrogenic cyclotron waves are avoided. Author (GRA)

N83-30183# Los Alamos Scientific Lab., N. Mex.
RESONANTLY ENHANCED VACUUM-ULTRAVIOLET GENERATION AND MULTIPHOTON IONIZATION IN CARBON MONOXIDE GAS
James H. Glownia and Robert K. Sander 1982 7 p refs Presented at the Opt. Soc. of Am. Topical Meeting on Laser Tech. for Extreme Ultraviolet Spectry., Boulder, Colo., 8-10 Mar. 1982
(Contract W-7405-eng-36)
(DE82-012147; LA-UR-82-820; CONF-820336-5) Avail: NTIS HC A02/MF A01

Competition between three photon resonantly enhanced vacuum ultraviolet third harmonic generation and six photon multiphoton ionization using the A state in gaseous carbon monoxide is observed. Excitation spectra of the third harmonic emission exhibit increasing blue shifts and broadening with increasing pressure due to the phase matching requirements. Estimates for the efficiency and tunability show that third harmonic generation in carbon monoxide molecules is a promising source for coherent vacuum ultraviolet light. DOE

N83-30184# California Univ., Berkeley. Lawrence Berkeley Lab.
FORMATION OF QUARK-GLUON PLASMA IN NUCLEAR COLLISIONS
M. Gyulassy Jun. 1982 14 p refs Presented at Workshop on Quark Matter Formation and Heavy Ion Collisions, Bielefeld, West Germany, 10 May 1982
(Contract W-7405-eng-48)
(DE82-018521; LBL-14512; CONF-8205102-2) Avail: NTIS HC A02/MF A01

The spatial dependence of the energy deposition in the fragmentation regions is estimated for nuclear collisions at ISR energies radical s/A > approximately 30 GeV/nucleon. Two models (the trailing cascade and sequential decay scenarios) are contrasted. The results are compared to the quark gluon plasma energy density computed via QCD lattice methods. DOE

N83-30185# Oak Ridge National Lab., Tenn. Chemical Physics Div.
MULTIPHOTON IONIZATION AND THIRD-HARMONIC GENERATION IN ATOMS AND MOLECULES
R. N. Compton 1982 7 p Presented at the 15th Ann. Radiological Phys. Contractors Meeting, Gettysburg, Pa., 4-6 May 1982
(Contract W-7405-eng-26)
(DE82-015748; CONF-820575-5) Avail: NTIS HC A02/MF A01

Resonantly enhanced multiphoton ionization (REMPI) provides a powerful new method for investigating atomic and molecular energy levels. The method is particularly useful in discovering and characterizing certain optically forbidden transitions. The method is particularly well suited for studying Rydberg transitions in molecules and is experimentally easier than the traditional use of far ultraviolet radiation in conventional spectroscopy. Research on multiphoton ionization and third harmonic generation is reviewed. DOE

N83-30186# European Organization for Nuclear Research, Geneva (Switzerland).
NEUTRINO OSCILLATIONS: PRESENT AND FUTURE EXPERIMENTS
Jorg Wotschack 31 Jul. 1981 22 p refs Presented at the 4th Warsaw Symp. on Elementary Particle Phys., Kazimierz, Poland, May 1981
(DE82-903207; CERN-EP-81-81; CONF-8105114-3) Avail: NTIS HC A02/MF A01

Neutrino oscillations are discovered. Several experiments have searched for oscillations and explored the range of neutrino mass differences to values as small as .01 e V squared without finding any convincing evidence for neutrino instability. Future experiments at accelerators will be able to improve the existing upper limits on mass differences for the different oscillation channels by roughly one order of magnitude. If neutrino oscillations are not discovered by that time only deep mine experiments (proton decay) will have a chance to extend the observable delta m squared range to .001 to .0001 e V squared studying cosmic neutrinos having traversed the Earth. Neutrino mass differences smaller than this are probably not accessible using present day methods. DOE

N83-30187# Los Alamos Scientific Lab., N. Mex.
RARE KAON DECAYS AT LAMPF 2
T. W. L. Sanford Jun. 1982 21 p refs
(Contract W-7405-eng-36)
(DE82-019191; LA-9385-MS) Avail: NTIS HC A02/MF A01

At LAMPF 2, intense beams of kaons can enable the rare kaon-decay processes to be investigated. Some of the possibilities include processes that test the standard model of Weinberg and Salam and those that are sensitive to new interactions. The flux of kaons and the sensitivity to these decays at LAMPF 2 are discussed. DOE

N83-30188# Stanford Linear Accelerator Center, Calif.
GLUEBALLS: A STATUS REPORT
Daniel L. Scharre 1982 19 p refs Presented at the 19th Orbis Sci. Meeting, Coral Gables, Fla., 18-21 Jan. 1982
(Contract DE-AC03-76SF-00515)
(DE82-009519; SU-SLAC-PUB-2880; CONF-820142-1) Avail: NTIS HC A02/MF A01

It is expected from quantum chromodynamics (QCD) that glueballs, bound states which contain gluons but no valence quarks, should exist. No conclusive evidence for glueballs has been offered. The expected properties and experimental signatures of glueballs are reviewed and the status of some glueball candidate states are discussed. DOE

N83-30189# Oak Ridge National Lab., Tenn.
FOLDING MODELS FOR ELASTIC AND INELASTIC SCATTERING
G. R. Satchler 1982 35 p refs Presented at the 5th Argentine Nucl. Phys. Workshop, Chapadmalal, Argentina, 12-18 Apr. 1982
(Contract W-7405-eng-26)
(DE82-013458; CONF-820440-4) Avail: NTIS HC A03/MF A01

The most widely used models are the optical model potential (OMP) for elastic scattering, and its generalization to nonspherical shapes, the deformed optical model potential (DOMP) for inelastic scattering. These models are simple and phenomenological; their parameters are adjusted so as to reproduce empirical data. Nonetheless, there are certain, not always well defined contraints to be imposed. The potential shapes and their parameter values must be reasonable and should vary in a smooth and systematic way with the masses of the colliding nuclei and their energy. Without these constraints, the potentials tell us very little, and they are essentially useless for other purposes. One way of satisfying these constraints, without going back to a much more fundamental theory, is through the use of folding models. DOE

N83-30190# Oak Ridge National Lab., Tenn.
RELATIONS BETWEEN THE SIMULTANEOUS AND SEQUENTIAL TRANSFER OF 2 NUCLEONS
G. R. Satchler 1982 11 p refs Presented at the Intern. Summer School on Heavy Ion Collisions, La Rabida, Spain, 7-19 Jun. 1982
(Contract W-7405-eng-26)
(DE82-017425; CONF-830663-3) Avail: NTIS HC A02/MF A01

The transfer of two nucleons between projectile and target in a direct or peripheral reaction such as (p,t) or (O16.C14) may occur in one step or two steps referred to as simultaneous and sequential transfers, respectively. In the former, the interaction acts once and both nucleons are transferred. In the latter, the interaction acts one to transfer one nucleon, the system then propagates in one or more intermediate states and is followed by a second action of the interaction to transfer the second nucleon. This process may be symbolized for the above examples as (p,d;d,t) (O16,N15;N15,C14) implying the intermediate formation of a deuteron or the nucleus N15. (Of course, the intermediate system may exist in more than one state of excitation). For simplicity, the (t,p) reaction is chosen to illustrate the theory. DOE

N83-30191# Oak Ridge National Lab., Tenn.
GAMMA DECAY OF UNBOUND STATES FOLLOWING NEUTRON CAPTURE
S. Raman 1982 13 p refs Presented at the 3rd Intern. Symp. on Neutron Induced Reactions, Smolenice, Czechoslovakia, 21-25 Jun. 1982
(Contract W-7405-eng-26)
(DE82-017305; CONF-820657-1) Avail: NTIS HC A02/MF A01

Neutron capture gamma-ray spectroscopy is a powerful technique to study the gamma-decay of unbound levels just above the neutron separation energy. It is generally believed that the (n,gamma) reaction proceeds by way of a compound nucleus raction of great complexity; and, therefore, the capture gamma-ray spectrum should be describable in terms of statistical laws. However, measurements have shown that effects are present due to single-particle motions and due to giant resonances. The study of (n,gamma) spectra averaged over as many resonances as possible provides one of the best experimental means of directly obtaining reliable values for radiative transition probabilities from highly excited nuclear states. In very select cases, unbound levels which are populated in allowed beta decay can also be observed as neutron resonances. These ideas are illustrated with examples of recent data. DOE

N83-30192# Oak Ridge National Lab., Tenn.
NUCLEAR-SPECTROSCOPY PROBLEMS STUDIED WITH NEUTRONS
S. Raman 1982 55 p refs Presented at the 4th Intern. School on Neutron Phys., Dubna, USSR, 8-18 Jun. 1982
(Contract W-7405-eng-26)
(DE82-017303; CONF-820658-1) Avail: NTIS HC A04/MF A01

Nuclear spectroscopy with neutrons continues to have a major impact on the progress of nuclear science. Neutrons, being uncharged, are particularly useful for the study of low energy reactions. Recent advances in time-of-flight spectroscopy, as well as in the gamma ray spectroscopy following neutron capture, have permitted precision studies of unbound and bound nuclear levels

and related phenomena. By going to new energy domains, by using polarized beams and targets, through the invention of new kinds of detectors, and through the general improvement in beam quantity and quality, new features of nuclear structure and reactions were obtained that are not only interesting per se but are also grist for old and new theory mills. The above technical advances have opened up opportunities for further discoveries. DOE

N83-30193# Los Alamos Scientific Lab., N. Mex.
APPLICATION OF ADJUSTED DATA IN CALCULATING FISSION-PRODUCT DECAY ENERGIES AND SPECTRA
D. C. George, R. J. LaBauve, and T. R. England Jun. 1982 56 p refs
(Contract W-7405-eng-36)
(DE82-019182; LA-9362-MS) Avail: NTIS HC A04/MF A01

The code ADENA, which approximately calculates fussion-product beta and gamma decay energies and spectra in 19 or fewer energy groups from a mixture of U235 and Pu239 fuels, is described. The calculation uses aggregate, adjusted data derived from a combination of several experiments and summation results based on the ENDF/B-V fission product file. The method used to obtain these adjusted data and the method used by ADENA to calculate fission-product decay energy with an absorption correction are described, and an estimate of the uncertainty of the ADENA results is given. Comparisons of this approximate method are made to experimental measurements, to the ANSI/ANS 5.1-1979 standard, and to other calculational methods. A listing of the complete computer code (ADENA) is contained in an appendix. Included in the listing are data statements containing the adjusted data in the form of parameters to be used in simple analytic functions. DOE

N83-30194# Los Alamos Scientific Lab., N. Mex.
ELECTRONIC ISOTOPE SHIFTS MUONIC ATOMS AND ELECTRON SCATTERING
E. B. Shera 14 Jul. 1983 32 p refs Presented at the Conf. on Lasers in Nucl. Phys., Oak Ridge, Tenn., 21-21 Apr. 1982
(Contract W-7405-eng-36)
(DE82-014040; LA-UR-82-1130; CONF-820428-2) Avail: NTIS HC A03/MF A01

The roles of electronic isotope shift, muonic atom, and electron scattering experiments in studying the nuclear charge distribution are discussed in terms of the potentials of each probe. Barium isotope shift data are presented as an example of a combined muonic optical analysis and the results are compared with droplet and IBA model predictions. A survey of muonic and (e,e) results is presented with emphasis on shell structure related features. DOE

N83-30195# Copenhagen Univ. (Denmark).
PROBING THE NUCLEAR STRUCTURE WITH HEAVY-ION REACTIONS
Ricardo A. Broglia 1982 53 p refs Presented at the Intern. Summer School on Heavy Ion Collisions, Huelva, Spain, 7 Jun. 1982 Prepared in cooperation with ORNL
(Contract W-7405-eng-26)
(DE82-017316; CONF-820663-1) Avail: NTIS HC A04/MF A01

Nuclei display distortions in both ordinary space and in gauge space. The spatial distribution of the Nilsson orbitals and the change of the pairing gap with the rotational frequency is studied through the analysis of one and two nucleon transfer reactions induced in heavy ion collisions. DOE

N83-30196# Los Alamos Scientific Lab., N. Mex.
GENERALIZED VIEW FACTOR TECHNIQUES FOR TREATING STREAMING AND SCATTERING IN NEUTRAL-PARTICLE TRANSPORT
William J. Krauser 1982 22 p ref Presented at the Los Alamos/CEA Appl. Phys. Conf., Paris, 19-23 Apr. 1982
(Contract W-7405-eng-36)
(DE82-014046; LA-UR-82-1046; CONF-820429-5) Avail: NTIS HC A02/MF A01

View factor techniques, and their generalization to time dependent static geometries, for treating neutral particle transport involving free streaming in enclosures are described. An approximation of the standard view factor technique which uses retarded times to treat time dependent, fixed geometry, 3-D vacuum enclosures is described. Procedures for the numerical determination of the view factors and the transport calculations themselves are described. The advantages and disadvantages of this technique are discussed. The limitations give rise to a new generalized view factor approach which is discussed in detail. Monte Carlo techniques are used to estimate the generalized view factors which are then adjusted slightly using the method of maximum likelihood and least squares minimization to satisfy appropriate thermodynamic consistency conditions. After the imposition of suitable initial and boundary conditions, the integral equations involving the expansion coefficients are solved. DOE

N83-30197# Los Alamos Scientific Lab., N. Mex.
RECENTLY DEVELOPED METHODS IN NEUTRAL-PARTICLE TRANSPORT CALCULATIONS: OVERVIEW
Raymond E. Alcouffe 1982 25 p refs Presented at the Los Alamos/CEA Appl. Phys. Conf., Paris, 19-23 Apr. 1982
(Contract W-7405-eng-36)
(DE82-014043; LA-UR-82-1071; CONF-820429-6) Avail: NTIS HC A02/MF A01

Successful, general methods for the solution of the neutral particle transport equation involve a close connection between the spatial discretization method used and the source acceleration method chosen. The first form of the transport equation, angular discretization (which is discrete ordinates) is considered as well as spatial discretization based upon a mesh arrangement. Characteristic methods are considered briefly in the context of future, desirable developments. The ideal spatial discretization method is described as having the following attributes: positive-positive boundary data yields a positive angular flux within the mesh including its boundaries; satisfies the particle balance equation over the mesh, that is, the method is conservative; possesses the diffusion limit independent of spatial mesh size, that is for a linearly isotropic flux assumption, the transport differencing reduces to a suitable diffusion equation differencing; the method is unconditionally acceleratable, i.e., for each mesh size, the method is unconditionally convergent with a source iteration acceleration. DOE

N83-30198# Oak Ridge National Lab., Tenn. Physics Div.
ELECTRON-IMPACT IONIZATION: TIME-DEPENDENT AND OTHER NUMERICAL APPROACHES
Christopher Bottcher 1982 5 p refs Presented at the Conf. on Recent Develop. in Electron-Atom and Electron-Molecule Collision Processes, Warrington, England, 26 Mar. 1982
(Contract W-7405-eng-26)
(DE82-017517; CONF-820382-1) Avail: NTIS HC A02/MF A01

Algorithms for the solution of electron-atom and electron-ion ionization collisions are described. Some results are given on the ionization of ground and excited states and ionized targets. DOE

N83-30199# Pittsburgh Univ., Pa. Dept. of Physics.
SOME PROSPECTS FOR ANTIPROTON PHYSICS
R. A. Eisenstein 1982 18 p refs Presented at the Los Alamos Meson Phys. Facility 2 Workshop, N. Mex., 1 Feb. 1982
(Contract DE-AS02-76ER-03244)
(DE82-011582; DOE/ER-0344/91) Avail: NTIS HC A02/MF A01

Some of the possibilities for fruitful research with antiprotons are outlined below. Special emphasis is placed on the possibility of learning about quark spectroscopy and dynamics using highly precise and intense anti p beams such as LEAR. it is urged that any discussion of LAMPF 2 give very careful consideration to the construction of a facility competitive with LEAR. DOE

N83-30200# Pacific Northwest Lab., Richland, Wash.
RADIATION STANDARDS AND CALIBRATIONS Annual Report, 1981
P. L. Roberson, R. C. Yoder (Pennsylvania Power and Light, Allentown), R. A. Fox, C. D. Hooker, R. T. Hogan, K. L. Holbrook,

and R. T. Hadley Jul. 1982 66 p refs
(Contract DE-AC06-76RL-01830)
(DE82-019748; PNL-4044) Avail: NTIS HC A04/MF A01

The research program encompasses: reviewing calibration standards, regulations, and handbooks; assuring that calibration procedures used are in agreement with technically accepted methods; maintaining basic radioactive sources and instruments that serve as radiological standards; and providing traceability to the National Bureau of Standards where possible. In addition, major efforts are being expended to upgrade the 318 calibration facility. This report focuses on major accomplishments during FY-1981. However, most maintenance and quality assurance efforts involve routine support and only a summary report is provided. DOE

N83-30201# California Univ., Berkeley. Lawrence Berkeley Lab.
NEUTRAL-PARTICLE-BEAM PRODUCTION AND INJECTION
D. Post and R. Pyle Jul. 1982 43 p refs Presented at the NATO Advan. Study Inst. Conf. on Atomic and Mol. Processes in Controlled Thermonucl. Res., Palermo, Italy, 19-30 Jul. 1982
(Contracts DE-AC03-76SF-00098; DE-AC02-76CH-03073)
(DE83-006966; LBL-15483; CONF-820731-2) Avail: NTIS HC A03/MF A01

A discussion of the interactions of neutral beams with confined plasmas was presented. The production and diagnosis of the neutral beams was discussed. In general, atoms, molecules, and ions of the isotopes of hydrogen are examined, but some heavier elements (for example, oxygen) are mentioned. The emphasis will be on single particle collisions, selected atomic processes on surfaces is included. DOE

N83-30202# California Univ., Los Angeles.
WAVELENGTH SCALING OF THE TWO-PLASMON DECAY AND STIMULATED RAMAN-SCATTERING INSTABILITIES Annual Progress Report, 10 Sep. 1981 - 9 Sep. 1982
Francis F. Chen, Chan Joshi, and Nizarahim A. Ebrahim (Yale Univ.) Mar. 1983 24 p refs
(Contract DE-AS08-81DP-40166)
(DE83-007905; DOE/DP-40166/1) Avail: NTIS HC A02/MF A01

Description of the joint work done on the two plasmon decay and stimulated Raman scattering instabilities at 0.35 micron laser wavelength is described. A brief summary of the theoretical work on how stimulated backscattering influences stimulated Raman scattering is also given. DOE

N83-30203# Stanford Linear Accelerator Center, Calif.
NEW-PARTICLE SPECTROSCOPY, QUARKONIUM AND GLUONIC MESONS
Elliott D. Bloom Oct. 1982 24 p refs Presented at the 21st Intern. Conf. on High Energy Phys., Paris, 26-31 Jul. 1982
(Contract DE-AC03-76SF-00515)
(DE83-007012; SU-SLAC-Pub-3005; CONF-820718-27) Avail: NTIS HC A02/MF A01

Recent experimental results on quarkonium and gluonic mesons are presented and discussed. Comparisons with theory are made. Quarkonium predictions seem to agree well experiment. The question of the experimental verification of gluonic mesons is clouded by the difficulty of the theoretical interpretation. DOE

N83-30204# Stanford Linear Accelerator Center, Calif.
QUARK-ANTIQUARK BOUND-STATE SPECTROSCOPY AND QCD
E. D. Bloom Nov. 1982 39 p refs Presented at the 9th SLAC Summer Inst. on Particle Phys., Stanford, Calif., 27 Jul. - 7 Aug. 1981
(Contract DE-AC03-76SF-00515)
(DE83-007062; SU-SLAC-Pub-3015; CONF-820709-3) Avail: NTIS HC A03/MF A01

The discussion covers quarks, the classification of ordinary mesons in terms of constituent quarks, hidden charm states and charmed mesons, bottom quarks, positronium as a model for quarti q, quantum chromodynamics and its foundation in experiment, the charmonium model, the mass of states, fine structure and hyperfine structure, classification, widths of states, rate and multipolarity of gamma transitions, questions about bottom, leptonic widths and the determination of Q/sub b/, the mass splitting of the n(3) S sub 1 states, the center of gravity of the masses of the n(3) P; states n(3) p; fine structure and classification, branching ratios for upsilon prime yields chi sub 6j and the tau cascade reactions, hyperfine splitting, and top. DOE

N83-30205# Argonne National Lab., Ill.
NUCLEAR STRUCTURE IN PION SCATTERING AND CHARGE EXCHANGE
Benjamin Zeidman and D. F. Geesaman 1982 18 p refs Presented at the 9th EPS Nucl. Phys. Div. Conf. on Nucl. Struct., Amsterdam, 29 Aug. 1982
(Contract W-31-109-ENG-38)
(DE83-007945; CONF-820828-8) Avail: NTIS HC A02/MF A01

Data from pion inelastic scattering and charge exchange experiments are discussed within the framework of a DWIA analysis. The properties of the pion-nucleon interaction transformed to the pion-nuclear system are used to infer new nuclear structure information for both discrete states and giant resonances. DOE

N83-30206# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
STUDIES ON PRODUCTION RESULTS IN THE REACTION OF OXYGEN ATOMS WITH ETHYLENE [UNTERSUCHUNGEN ZUR PRODUKTBILDUNG IN DER REAKTION VON SAUERSTOF-FATOMEN MIT ETHYLEN]
F. Temps and H. Gg. Wagner Dec. 1982 19 p refs In GERMAN
(MPIS-18/1982; ISSN-0436-1199) Avail: NTIS HC A02/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 5,85

The importance of the channel O+C2H4 yields CH3+HCO (1a) in the reaction of oxygen atoms with ethylene was determined at room temperature in an isothermal discharge flow reactor with helium as carrier gas. The O atoms and HCO radicals were monitored by laser magnetic resonance spectrometer. The sensitivity was determined directly before or after the measurements. The O consumption is nearly complete. Consecutive reactions play no role. The HCO consumption due to reactions with other products and with O, is negligible. The contribution of channel (1a) results from the ratio of the concentrations of HCO formed and O consumed. In the pressure regime 1 mbar $< p < 4$ values between $0{,}35 < k1a/k1 < 0{,}60$ were obtained. Author (ESA)

N83-30207# Science Research Council, Chilton (England).
PARTICLE PHYSICS EXPERIMENTS, 1981
M. D. Rousseau and G. Stuart 1981 235 p
(PB83-164715; RL-82-001) Avail: NTIS HC A11/MF A01 CSCL 20H

Fifty four papers are presented, most dealing with collaborations between various particle physics research laboratories. Subjects studies are considered under the following broad headings: particles (baryons, hyperons and leptons; anti-particles; heavy particles); processes (interactions; high-momentum collisions; exchange processes; particle anti-particle events; scattering; spin-rotation; decay rates) and equipment (spectrometers; detectors). Other aspects reported on include charm, strangeness and fractional charge. Publications resulting from the experiments are also given. GRA

N83-30208# Science Research Council, Chilton (England).
NUMERICAL STUDIES OF THE INTRINSIC CHARM MODEL
R. J. N. Phillips 1982 14 p refs
(PB83-164798; RL-82-004) Avail: NTIS HC A02/MF A01 CSCL 20H

Explict calculations of the model five-quark wave-function, suggested by Brodsky and co-workers to describe uudc(c bar) Fock components in the proton, allow one to address quantitative questions such as the normalization relative to uuds(s bar) and uudb(b bar) components and the threshold behavior of structure functions for charm production. The results suggest that the intrinsic charm normalization should be less than 1%, that the b/c

normalization ratio should be of order 0.2 and that threshold suppression in F2 turns off rather rapidly above threshold. GRA

N83-30209# Science Research Council, Chilton (England).
DETERMINATION OF THE ALPHA PARAMETER FOR THE DECAY OF xi MINUS INTO LAMBDA Pi MINUS
S. F. Biagi, M. Bourquin, A. J. Britten, R. M. Brown, and H. Burckhart 1982 14 p refs
(PB83-164814; RL-82-008) Avail: NTIS HC A02/MF A01 CSCL 20H

The alpha parameter was determined to be -0.462 plus or minus 0.015, from a sample of 150,000 events recorded in the CERN SPS hyperon beam. This value was some 2.5 standard deviations higher than the current world average. GRA

N83-30210# Science Research Council, Daresbury (England).
TOPICS IN HEAVY ION REACTIONS
A. K. Dhar, comp., J. S. Lilley, comp, and M. A. Nagarajan, comp. 1981 119 p refs Presented at the Study Weekend, Daresby, England, 4-5 Oct. 1980
(PB83-164939; DL/NUC-R-21; ISSN-0144-6495) Avail: NTIS HC A06/MF A01 CSCL 20H

Details of current theoretical approaches and experimental work on heavy ion reactions were discussed. Subjects covered included: factors influencing yields of fusion, fission and deep inelastic reactions; fragmentation processes in nucleus-nucleus reactions and alpha particle emissions originating in deep inelastic reactions. The use of 6Li ion beams to study break-up reactions and polarized Li ion beams were discussed. In addition, peripheral break-up reactions involving heavy ions and heavy ion inelastic scattering reactions were reviewed. Essential features observed in heavy ion reactions were shown to agree with time-dependent Hartree-Fock calculations. GRA

N83-30211# Oxford Univ. (England). Nuclear Physics Lab.
INTRODUCTION TO THE POSSIBLE SUBSTRUCTURE OF QUARKS AND LEPTONS
Louis Lyons Jun. 1982 100 p refs
(PB83-165605; OU/NPL-52-82) Avail: NTIS HC A05/MF A01 CSCL 20H

In an attempt to examine the possible compositeness of quarks and leptons, experiments relevant to the non-point-like nature of these fermions were reviewed. Data were used to deduce limits on the substructure energy scale. Some specific models of quark and lepton structure proposed recently were discussed. Emphasis was focused on which predictions could be tested experimentally. Experiments were developed which could increase the energy range in which substructure could be probed and thus provide a more realistic basis on which to discuss compositeness. GRA

N83-30212# Science Research Council, Chilton (England).
SURVEY OF MODELS OF BARYON PRODUCTION IN E PLUS E MINUS ANNIHILATION
K. W. Bell, B. Foster, J. C. Hart, J. Proudfoot, and D. H. Saxon 1982 53 p refs
(PB83-166850; RL-82-01) Avail: NTIS HC A04/MF A01 CSCL 20H

Current models of e + e- annihilation to hadrons, including baryons, were reviewed and compared with available data. The experimental predictions of most models were found to be very similar. Most models contain one or more free parameters which can be tuned to give an adequate fit to the small amount of data. However, the fundamental differences between some models were examined as a source of future experimental testing. All published data on baryon production in e + e- annihilation were summarized in 4 tables and 9 graphs. An appendix provides advice to authors of new event generators. GRA

N83-30213# Science Research Council, Chilton (England).
LIMITS ON NEUTRINO-ANTINEUTRINO TRANSITIONS FROM A STUDY OF HIGH ENERGY NEUTRINO INTERACTIONS
A. M. Cooper, J. G. Guy, A. G. Michette, M. Tyndel, and W. Venus 1981 14 p refs
(PB83-165944; RL-81-055) Avail: NTIS HC A02/MF A01 CSCL 20H

This forms part of a study of neutrino mixing in a search for possible violation of conservation laws. Electron and positron tracks were distinguished from (v sub e) and (v bar sub e) charged current interactions in a large bubble chamber filled with a neon-hydrogen mixture. No evidence was seen for neutrino-antineutrino oscillations in the CERN SPS wide band neutrino beam. Upper limits were established for oscillation parameters, majoron emission and lepton number violating pi and k decays. GRA

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation.*

N83-30214# California Univ., Livermore. Lawrence Livermore Lab.
INCORPORATION OF HIGH LEVEL WASTES IN SYNROC: RESULTS FROM RECENT PROCESS ENGINEERING STUDIES AT LAWRENCE LIVERMORE NATIONAL LABORATORY
J. H. Campbell, C. L. Hoenig, F. J. Ackerman, P. E. Peters, and J. Z. Grens 15 Apr. 1982 11 p refs Presented at the 5th Intern. Symp. on the Sci. Basis for Radioactive Waste Management, Berlin, 7-11 Jun. 1982
(Contract W-7405-eng-48)
(DE82-013402; UCRL-87065; CONF-820636-2) Avail: NTIS HC A02/MF A01

Highlights from recent engineering research and development, in particular, results from fluidized bed calcination studies of SYNROC slurry are summarized. A schematic diagram of the envisoned SYNROC process (at this stage of development) is also presented. It shows the use of a fluidized bed calciner to prepare SYNROC powder that is then fed to a storage hopper. Bellows-type canisters are filled, evacuated, sealed and preheated. The preheated canisters are loaded into a hot isotactic pressing unit where they are densified, then removed and cooled and finally loaded into a waste storage container. After sealing, this container is decontaminated and transferred to the interim storage facility and then, ultimately, to an underground repository. DOE

N83-30215# Rockwell International Corp., Richland, Wash.
HANFORD SOLID-WASTE HANDLING FACILITY STRATEGY
J. F. Albaugh May 1982 8 p
(Contract DE-AC06-77RL-01030)
(DE82-017163; RHO-WM-SA-4) Avail: NTIS HC A02/MF A01

Prior to 1970, transuranic (TRU) solid waste was disposed of at Hanford by shallow land burial. Since 1970, TRU solid waste has been stored in near surface trenches designed to facilitate retrieval after twenty year storage period. Current strategy calls for final disposal in a geologic repository. Funding permitting, in 1983, certification of newly generated TRU waste to the Waste Isolation Pilot Plant (WIPP) criteria for geologic disposal will be initiated. Certified and uncertified waste will continue to be stored at Hanford in retrievable storage until a firm schedule for shipment to WIPP is developed. Previously stored wastes retrieved for geologic disposal and newly generated uncertified waste requires processing to assure compliance with disposal criteria. A facility to perform this function is being developed. A study to determine the requirements of this Waste Receiving and Processing (WRAP) Facility is currently being conducted. DOE

N83-30216# California Univ., Livermore. Lawrence Livermore Lab.
AN INDUCTIVE-STORE, PULSED POWER SOURCE
Robert H. Barlett and Hitoshi T. Takemori Apr. 1982 22 p refs
(Contract W-7405-eng-48)
(DE82-015443; UCID-19382) Avail: NTIS HC A02/MF A01

Design considerations and experimental results of an inductive

store, pulsed source are presented. A 100 mm diameter, gun-fired projectile of approximately 2MJ kinetic energy was the input energy source. An initial magnetic field was trapped and compressed by the projectile. With a shorted load, a megajoule in a nanohenry was the design goal, i.e., 50% energy transformation from kinetic to magnetic. Five percent conversion was the highest recorded before gauge failure. DOE

N83-30217# Sandia Labs., Albuquerque, N. Mex. Transportation Systems Technology and Analysis Div.
ANALYSIS, SCALE MODELING, AND FULL-SCALE TESTS OF LOW-LEVEL NUCLEAR-WASTE-DRUM RESPONSE TO ACCIDENT ENVIRONMENTS
Michael Huerta (Southwest Engineering Associates), Gene H. Lamoreaux, Laverne E. Romesberg, H. Richard Yoshimura, Brian J. Joseph, and Rodney A. May Jan. 1983 70 p refs
(Contract DE-AC04-76DP-00789)
(DE83-007587; SAND-80-2517) Avail: NTIS HC A04/MF A01

Extensive full scale and scale model testing of 55 gallon drums used for shipping low level radioactive waste materials are described. The tests conducted include static crush, single can impact tests, and side impact tests of eight stacked drums. Static crush forces were measured and crush energies calculated. The tests were performed in full, quarter, and eight scale with different types of waste materials. The full scale drums were modeled with standard food product cans. The response of the containers is reported in terms of drum deformations and lid behavior. The results of the scale model tests are correlated to the results of the full scale drums. Two computer techniques for calculating the response of drum stacks are presented. DOE

N83-30218# Rockwell International Corp., Canoga Park, Calif. Energy Systems Group.
COMMERCIAL HIGH-LEVEL-WASTE MANAGEMENT: OPTIONS AND ECONOMICS. A COMPARATIVE ANALYSIS OF THE CERAMIC AND GLASS WASTE FORMS
R. L. McKisson, L. F. Grantham, J. Guon, and H. L. Recht 25 Feb. 1983 133 p refs
(Contract DE-AC09-79ET-41900)
(DE83-006235; DOE/ET-41900/17; ESG-DOE-13391) Avail: NTIS HC A07/MF A01

Results of an estimate of the waste management costs of the commercial high level waste from a 3000 metric ton per year reprocessing plant show that the judicious use of the ceramic waste form can save about $2 billion during a 20 year operating campaign relative to the use of the glass waste form. This assumes PWR fuel is processed and the waste is encapsulated in 0.305-m-diam canisters with ultimate emplacement in a BWIP-type horizontal-borehole repository. Waste loading and waste form density are the driving factors in that the low waste loading (25%) and relatively low density (3.1 g cu cm) characteristic of the glass form require several times as many canisters to handle a given waste throughput than is needed for the ceramic waste form whose waste loading capability exceeds 60% and whose waste density is nominally 5.2 cu cm. DOE

N83-30219# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
A PROCESS FOR LOCATING SHALLOW LAND-BURIAL SITES FOR LOW LEVEL RADIOACTIVE WASTE
Mar. 1983 73 p refs
(Contract DE-AC07-76SD-01570)
(DE83-008173; DOE/LLW-16T) Avail: NTIS HC A04/MF A01

The development of a screening process for siting low level radioactive waste disposal facilities, and a test application of that process are described. The site selection criteria were developed based on the Nuclear Regulatory Commission's disposal regulation, 10 CFR 61. Data on the geologic, hydrologic, and geographic systems were analyzed to select a suitable area for low level waste disposal. Selection of the best candidate area was based on: remoteness from population centers, availability of major transportation systems, low risk of flooding, erosion resistance, lack of geologic hazards, and other factors. DOE

74 OPTICS

Includes light phenomena.

N83-30220 Arizona Univ., Tucson.
USE OF A PRIORI INFORMATION FOR IMPROVED TOMOGRAPHIC IMAGING IN CODED-APERTURE SYSTEMS Ph.D. Thesis
Gene Robert Gindi 1982 273 p
Avail: Univ. Microfilms Order No. DA8227351

Coded aperture imaging offers a method of classical tomographic imaging by encoding the distance of a point from the detector by the lateral scale of the point response function. An estimate, termed a layergram, of the transverse sections of the object can be obtained by performing a simple correlation on the detector data. The estimate of one transverse plane contains artifacts contributed by source points from all other planes. These artifacts can be partially removed by a nonlinear algorithm which incorporates a priori knowledge of total integrated object activity per transverse plane, positivity of the quantity being measured, and lateral extent of the object in each plane. The algorithm is iterative and contains, at each step, a linear operation followed by the imposition of a constraint. The use of this class of algorithms is tested by simulating a coded aperture imaging situation using a one dimensional code and two dimensional (one axis perpendicular to aperture) object. Results show nearly perfect reconstructions in noise free cases for the codes. The problems inherent in a prototype device are characterized and results of its performance are presented. Dissert. Abstr.

N83-30221 Arizona Univ., Tucson.
ENTROPY AND INFORMATION IN THE DESIGN AND ANALYSIS OF IMAGING SYSTEMS Ph.D. Thesis
Farhang Sabet-Peyman 1982 207 p
Avail: Univ. Microfilms Order No. DA8227366

The application of Shannon's information in pupil design, the characterization of noise, and study of its behavior in a specific electro-optical system, and estimation of the degraded spread function in atmospherical imagery using the maximum entropy method are explored. It is shown that a pupil designed to maximize Shannon's information throughput is an apodizer, resulting in resolution and contrast enhancement when compared to the diffraction limited case. The Strehl ratio is about 0.55. Investigation of statistical and spectral properties as a function of gray level in an electro-optical tracking system indicates that the noise is white, having a wide band and a close to Gaussian distribution. Estimating the spread function via maximum entropy technique revealed some remarkable results. Using an edge as the object, simulation studies predict a superior estimate in the mean squared error sense to those of the least squares in the presence of three types of noise (signal dependent Gaussian and Poisson, and signal independent Gaussian noise). Information theory, linear systems theory, sampling theory and more particularly, statistics and the Fast Fourier Transform are used to derive the results.
Dissert. Abstr.

N83-30222*# National Aeronautics and Space Administration. Pasadena Office, Calif.
X-RAY IMAGING MIRROR SYSTEM AND METHOD OF PRODUCING THE SAME Patent Application
James H. Underwood (JPL, California Inst. of Tech., Pasadena) and Troy H. Barbee, inventors (to NASA) (JPL, California Inst. of Tech., Pasadena) Filed 26 Aug. 1982 17 p Sponsored by NASA
(NASA-Case-NPO-15828-1; US-Patent-Appl-SN-411767) Avail: NTIS HC A02/MF A01 CSCL 20F

An X-ray mirror assembly capable of reflecting X-rays at a normal incident angle is described as well as a method for its production. The mirror assembly includes multi-layers of a high- and low-refractive index material on an extremely smooth substrate such as a silicon wafer. Approximately 152 layers of alternatively a spacer material and a heavy metal, in a thickness range of 1 nanometer, is placed on a silicon wafer. The wafer substrate can be subsequently bent around its periphery by a bending

assembly to create a concave configuration. The resulting mirror assembly is capable of focusing normal-incident X-ray radiation, for example, of 4.5 nanometers with a reflection of 6% or greater. NASA

N83-30223# Naval Postgraduate School, Monterey, Calif.
A FIELD VISIBILITY COMPARISON BETWEEN ELECTROLUMINESCENT SOURCES AND STANDARD US COAST GUARD INCANDESCENT AIDS-TO-NAVIGATION SOURCES M.S. Thesis
John Richard Thacker Oct. 1982 89 p refs
(AD-A125575) Avail: NTIS HC A05/MF A01 CSCL 13/1

The U.S. Coast Guard has traditionally relied on incandescent sources for lighted aids-to-navigation. However, incandescent sources suffer from scintillation, halo effects, catastrophic failure, and other problems. Electroluminescence (EL) may offer some advantages in overcoming these difficulties. From approximately 1.3 miles distant, sixteen observers made simultaneous brightness comparisons between EL and selected standard incandescent aids-to-navigation sources for both red and green colors. In addition, a test was conducted to determine if any of several spatial arrangements of EL panels were perceived as brighter. Green EL sources seemed to perform better than predicted, consistently brighter than their incandescent counterparts. The spatial arrangement test indicated that no statistically discernable difference existed in perceived EL brightness in any of the tested panel arrangements. GRA

N83-30224# Honeywell Corporate Technology Center, Bloomingdale, Minn.
METAL COATED OPTICAL FIBERS FOR SENSORS Final Report, 8 Sep. 1980 - 31 Dec. 1982
G. Benjamin Hocker and John D. Skogen Mar. 1983 80 p refs
(Contract N00173-80-C-0424)
(AD-A126068) Avail: NTIS HC A05/MF A01 CSCL 11/3

This report describes techniques for applying nickel coatings to optical fibers by electroplating. The purpose is to produce optical fibers for sensors which are acoustically insensitive, and fibers which are magnetically sensitive. Author (GRA)

N83-30225# TRW Electronic Components Group, Philadelphia, Pa. Research and Development Labs.
FIELD EXPEDIENT REPAIR OF FIBER OPTIC CABLES Interim Report, 1 May 1981 - 31 Oct. 1982
John G. Woods Nov. 1982 34 p refs
(Contract DAAK80-81-C-0085)
(AD-A126075; CECOM-81-C-0085-2) Avail: NTIS HC A03/MF A01 CSCL 20/6

This second interim report describes the development of a field expedient fibers optics cable splicing system. The field splice kit will include a manually operated splicing machine which includes all of the tools, mounted on a single platform, for making the field repair. The splice consists of glass four-rod alignment guides pre-mounted in the splice housing, which also provides the means for fiber and cable retentions. The Phase 1 brass-board splicer is described in detail with the aid of photographs. The Phase 2 design is based on the concepts used in the brassboard model, with many modifications to improve the ease and speed of repair, as well as to reduce weight and cost of the repair kit. Author (GRA)

N83-30226# Washington Univ., Seattle. Dept. of Electrical Engineering.
MULTIPLE SCATTERING EFFECTS ON TRANSMISSION THROUGH THE ATMOSPHERE Annual Summary Report
Akira Ishimaru Mar. 1983 8 p
(Contract N00014-78-C-0723)
(AD-A126010; TR-5-ONR) Avail: NTIS HC A02/MF A01 CSCL 20/6

This annual report gives a summary of the work completed and underway on the contract covering the period form September 1, 1982 to March 31, 1983. The work is directed to the investigation of the transmission characteristics of optical waves with wavelengths in the range of 1-15 micrometers through various atmospheric conditions including clouds, fog, turbulence, rain, hail, snow, and inhomogeneous layers. Progress was made on the thorough understanding of polarized wave transmission characteristics through fog. Author (GRA)

N83-30227# Air Force Academy, Colo.
INFRARED DETECTION OF MICROWAVE INDUCED SURFACE CURRENTS ON FLAT PLATES Final Technical Report
Ronald M. Sega Griffiss AFB, N.Y. RADC Dec. 1982 368 p refs
(AF Proj. 2338)
(AD-A126207; RADC-TR-82-308) Avail: NTIS HC A17/MF A01 CSCL 17/5

The surface currents induced by electromagnetic radiation incident on conductive bodies produce joule heating measurable by infrared techniques. Qualitative studies have shown that surface current amplitude information can be determined from the surface heating pattern. A quantitative analysis, via infrared techniques, of surface current amplitude distributions on the flat plates is presented, and the results are compared to actual current distributions determined from electromagnetic computer code calculations and probe measurements. This correlation study on flat plates is an essential step toward the infrared measurement of current amplitude distributions on more complex shapes. GRA

N83-30228# Phoenix Corp., McLean, Va.
FIBER OPTIC MAGNETIC SENSOR RESEARCH Final Report, 21 May 1982 - 28 Feb. 1983
Samuel J. Petuchowski 28 Feb. 1983 25 p refs
(Contracts N00014-82-C-2201; N00014-81-C-2148)
(AD-A126325) Avail: NTIS HC A02/MF A01 CSCL 17/6

The direction of technological advance which will lead to the development of a deployable fiber-optic magnetic sensor has been brought into closer focus as a result of studies conducted under this contract. It is useful to categorize our work as comprised of the following constituent efforts: (a) Componentry and configuration of optical sensors in general; (b) Transductive componentry whereby a magnetic field effects a measurable change in a sensor system. This includes characterization and optimization of magnetostrictive materials; (c) Configuration of a magneto-sensitive material for specialized applications (tailoring of orientational characteristics, for example) for measurement of total field, vector field, field gradient, etc.; (d) Data acquisition techniques suited to the chosen transduction mechanism and the optical configuration and sensitivity/spectral-response requirements of the application. GRA

N83-30229# Illinois Univ., Urbana. Coordinated Science Lab.
AN APPLICATION OF DIGITAL EXTRAPOLATION IN ARRAY PROCESSING
H. Fan, E. I. El-Masry, and W. K. Jenkins Jan. 1983 73 p refs
(Contract N00014-79-C-0424)
(AD-A125871; UILU-ENG-83-2204; R-983) Avail: NTIS HC A04/MF A01 CSCL 20/6

In the area of signal processing, considerable attention has been devoted to digital array processing in recent years. This attention is due to the increasingly wide use of array processing for both civilian and military purposes. Digital beamforming, for example, is popular because of its advantages in speed, accuracy, etc., over conventional analog beamforming. Many papers concerning digital beamforming have recently been published. It has been shown that the quality of performance of a beamformer, such as beam pattern, signal-to-noise ratio, etc., depends on a great extent on the number of sensors used, i.e., the more sensors used, the better the beam pattern becomes. In a practical situation, however, the number of sensors may be restricted by economical reasons or physical restrictions. In this situation one may weight the output of each sensor before beamforming. This helps to some extent, although the improvement is rather limited. A totally different issue, signal extrapolation, has also been drawing a great amount of interest recently, largely in the area of spectral estimation. It has been shown that a known portion of a signal can be extrapolated outside of the observation interval if the signal possesses certain

property. Many algorithms, both iterative and non-iterative, have been proposed for both continuous and discrete cases. The purpose of this thesis is to use spatial signal extrapolation in digital beamforming to improve the beam pattern without adding more physical sensors. Effectively, the sensors are added synthetically through signal processing. This has the potential to improve performance considerably. GRA

N83-30230# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
FIBER OPTICS IN AIRCRAFT APPLICATIONS
Wang Wenying 1 Feb. 1983 18 p Transl. into ENGLISH from Guoji Hangkong (China), no. 234, Aug. 1982 p 36-39
(AD-A126165; FTD-ID(RS)T-1608-82) Avail: NTIS HC A02/MF A01 CSCL 20/6

The optical fiber is a transmission medium with extensive usages. If properly designed, the fiber can replace twisted copper wire cable, coaxial cable, and metal waveguide. The sole method of solving the problems of countermeasures against electromagnetic interference/impact and nuclear radiation is the use of optical fiber for the transmission line because the fiber is a medium material, which does not radiate energy and does not have ground circulating current. Author

N83-30231# Los Alamos Scientific Lab., N. Mex.
OPTICAL PUMPING FOR INTENSE POLARIZED ION SOURCES
W. D. Cornelius, D. J. Taylor, R. L. York, and E. A. Hinds (Yale Univ., New Haven, Conn.) 1982 11 p refs Presented at the Conf. on Lasers in Nucl. Phy., Oak Ridge, Tenn., 21-23 Apr. 1982
(Contract W-7405-eng-36)
(DE82-012136; LA-UR-82-783; CONF-820428-1) Avail: NTIS HC A02/MF A01

Laser optical pumping without buffer gas in dense sodium vapor targets was investigated. The atomic polarization of the target was determined from the Faraday rotation angle of a second dye laser tuned midway between the sodium D-lines. Substantial polarizations were measured even though the pump laser bandwidth was much smaller than the Doppler and hyperfine broadened sodium absorption line. Theoretical calculations based on rate equations in an idealized 3-level, A-type system adequately reproduce the data. These calculations predict very high polarization at power levels produced in commercially available ring dye lasers. DOE

N83-30232# California Univ., Livermore. Lawrence Livermore Lab.
OPTICAL-SCATTERING MEASUREMENTS FROM 1.06-MICRON, 0.53-MICRON, AND 0.35-MICRON LASER-HEATED DISK TARGETS
R. E. Turner, E. M. Campbell, D. W. Phillion, W. C. Mead, F. Ze, C. Max, B. Lasinski, and K. G. Estabrook 1982 33 p refs Presented at the Am. Phys. Soc. Spring Meeting, Washington, D.C. 26-29 Apr. 1982
(Contract W-7405-eng-48)
(DE82-015418; UCRL-87218; CONF-820457-1) Avail: NTIS HC A03/MF A01

A discussion is presented on scattered light measurements relevant to three of the important parametric instabilities which occur in high intensity laser plasma interactions: stimulated Brillouin scattering, the two plasmon decay instability (2-w/sub pe/), and stimulated Raman scattering. Most of these experiments were carried out on the ARGUS facility. Its configuration is described for the multiple wavelength experiments, all of which were conducted with one beam illumination of flat disk targets. DOE

N83-30233# Sandia Labs., Albuquerque, N. Mex. Electrical Standards Div.
AN ELEMENTARY APPROACH TO THE SIX-PORT REFLECTOMETER, ITS THEORY AND IMPLEMENTATION
Robert D. Moyer Apr. 1982 17 p refs
(Contract DE-AC04-76DP-00789)
(DE82-015514; SAND-81-2651) Avail: NTIS HC A02/MF A01

Over the past decade, the theory and performance of the six-port reflectometer as a basis for network analysis measurements have been developed to a very high degree. The relatively complex theory is well documented in a sizable body of literature. The key ideas from several sources in the literature are brought together and presented in a way which hopefully helps one develop a satisfying intuitive feel for just how a six-port reflectometer operates. In addition, suggestions are made which should allow many laboratories to appropriate the advantages of the six-port reflectometer (in a limited way) without the necessity of a large capital outlay. DOE

N83-30234# National Bureau of Standards, Washington, D.C. National Engineering Lab.
QUALITY OF INSPECTIONS UTILIZING INFRARED TECHNOLOGY ON WEATHERIZATION RETROFIT INSTALLATIONS
Yui-May L. Chang and Richard A. Grot Nov. 1982 111 p refs Sponsored in part by DOE
(PB83-146936; NBSIR-82-2510) Avail: NTIS HC A06/MF A01 CSCL 13M

A comparative evaluation of various portable infrared sensing systems used for detecting heat loss anomalies within building envelopes was performed. Application and reliability of using infrared technology was assessed. Twelve single family residences in three cities from the Weatherization Program of the Community Services Administration were employed as field samples. The results of infrared surveys carried out by thermographic surveying firms and those by the National Bureau of Standards were analyzed and compared in the categories of completeness of scanning, identification of defects, weather condition of inspection, and method of equipment operation. The thermograms of uninsulated areas, sketches of observed thermal deficiencies, and total areas of defects for each dwelling are presented. GRA

N83-30235# Technische Hogeschool, Delft (Netherlands). Dept. of Electrical Engineering.
PROPAGATION PROPERTIES OF SURFACE-WAVE MODES IN A QUASI-MULTIMODE, UNIAXIALLY ANISOTROPIC, GRADED-INDEX OPTICAL WAVEGUIDE WITH CIRCULARLY CYLINDRICAL SYMMETRY
R. duCloux Sep. 1981 93 p refs
(PB83-165167; Rept-1981-22) Avail: NTIS HC A05/MF A01 CSCL 20F

A rigorous theory of the propagation of surface wave modes along a radially inhomogeneous, uniaxially anisotropic optical waveguide is presented. The resulting two point boundary value problem is solved numerically using a shooting method. Dispersion curves are obtained for the lower order modes of three different fibers. In addition, the phase delay group time delay, pulse width broadening and field distributions of the fundamental mode was computed. In order to attain a relatively small change in these quantities, it appears that rather strong anisotropies are needed. Several analytical results pertaining to the step index fiber and a grade index fiber with a quadratic permitivity profile are included. GRA

N83-29282# Joint Publications Research Service, Arlington, Va.
OPTICAL ORIENTATION IN SPACE
V. Savinykh *In its* USSR Rept.: Space, No. 22 (JPRS-83612) 6 Jun. 1983 p 13-16 Transl. into ENGLISH from Aviatsiya i Kosmonavtika (Moscow), no. 1, Jan. 1983 p 42-43 (For primary document see N83-29280 18-12)
Avail: NTIS HC A06

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.

For ionospheric plasmas see *46 Geophysics.* For space plasmas see *90 Astrophysics.*

N83-30236# Committee on Science and Technology (U. S. House).
FUSION ENERGY WORKSHOP
Washington GPO 1982 161 p Joint hearing before the Subcomm.

on Energy Res. and Production of the Comm. on Sci. and Technol. and the Subcomm. on Energy Res. and Develop. of the Comm. on Energy and Nat. Resources, 97th Congr., 2nd Sess., No. 176, 8 Sep. 1982
(Publ-97-128; GPO-12-821) Avail: Subcommittee on Energy Research and Production

Technology and public policy related to magnetic fusion research and development in the United States are discussed. Physics issues which must be addressed are identified and examined. International cooperation and the types of reactors being developed in other countries are considered as well as program characteristics, risk levels, and management approaches in the United States. A.R.H.

N83-30237# Indiana Univ., Bloomington. Dept. of Chemistry.
MODIFICATION OF A PLASMA-THERM INDUCTIVELY COUPLED PLASMA SUPPLY TO ENABLE RF POWER MODULATION Interim Technical Report
R. E. Ensman, J. W. Carr, and G. M. Hieftje 25 Mar. 1983 14 p ref Submitted for publication
(Contract N00014-76-C-0838; Grants NSF CHE-79-18073; NSF CHE-80-25633; NR Proj. 051-622)
(AD-A126232; INDU/DC/GMH/TR-83-54) Avail: NTIS HC A02/MF A01 CSCL 20/9

A modification to a commercial radio-frequency power supply is outlined which enables the RF output power to be modulated over a broad frequency range (dc to 0.5 MHz). The modified power unit is used to drive an inductively coupled plasma of the kind utilized for elemental analysis. Applications of the modified unit include the study of energy storage and migration in the plasma and the modulation of atomic emission signals from elements present in chemical samples. Author (GRA)

N83-30238# JAYCOR, Alexandria, Va.
MODELING OF IMPLODED ANNULAR PLASMAS Final Report, 1 Nov. 1980 - 1 Nov. 1981
John U. Gillory and Robert E. Terry 1 Apr. 1982 42 p refs
(Contract DNA001-79-C-0189)
(AD-A126179; AD-E301079; DNA-6152F; JAYCOR-J207-82-009) Avail: NTIS HC A03/MF A01 CSCL 10/2

During this period the primary emphasis has been on developing improved one-dimensional MHD code techniques for imploding plasma with radiative energy flow, in diode electromagnetic cavities. Other computational tools necessary for this, including smooth interpolator routines, have also been developed for use in various parts of the NRL program modeling plasma radiation sources. These computational developments are summarized in Part A of this report and details are given in an accompanying technical report. GRA

N83-30239# Washington Univ., Seattle. Aerospace and Energetics Research Program.
CONFINEMENT AND HEATING OF HIGH-BETA PLASMAS WITH EMPHASIS ON COMPACT TOROIDS. TASK 2: HIGH-BETA Q-MACHINE EXPERIMENT Annual Report, period ending 31 May 1982
F. L. Ribe 1982 39 p refs
(Contract DE-AT06-76ET-53047)
(DE82-020341; DOE/ET-53047/T1; UWFPP-27) Avail: NTIS HC A03/MF A01

Work done on the high beta Q machine (HBQM), which is a 3 meter long, low compression theta pinch with a 22 cm diameter segmented compression coil with a minimum axial peridicity length of 10 cm is summarized. The main activities are low density field reversed cell formation and radio frequency fast wave heating experiment on a zero bias plasma column. In addition, further engineering improvements on the HBQM and on the digital data acquisition system are reported. DOE

N83-30240# Oak Ridge National Lab., Tenn. Fusion Energy Div.
STELLARATOR PHYSICS EVALUATION STUDIES
B. A. Carreras, J. H. Harris, J. A. Rome, J. F. Lyon, R. A. Dory, L. Garcia, T. C. Hender, S. P. Hirshman, T. C. Jernigan, J. Sheffield et al Feb. 1983 22 p refs Prepared in cooperation with MIT
(Contract W-7405-eng-26)
(DE83-006359; ORNL/TM-8496) Avail: NTIS HC A02/MF A01

Stellarator/torsatron configurations with a wide range of parameters have been evaluated and compared in terms of their vacuum field topoloty, magnetohydrodynamic equilibrium and stability, and guiding center orbit confinement. The torsatron configurations are found to be the most suitable choice for a near-term physics experiment. The best of these configuration has an equilibrium beta limit of (ALPHA) approx. = 5% for a plasma aspect ratio of 7. The equilibrium limit can be increased to (ALPHA) approx. = 8% by doubling the aspect ratio. Modularization of the torsatron coils can be achieved in a practical way that retains all the physics properties of the configuration. The modularization introduces additional flexibility, which allows the realization of a larger variety of vacuum flux surface topologies. The feasibility of modularizing the coils and the reasonable physics parameters found for a configuration with moderate aspect ratio make torsatron configurations very attractive, both for physics experiments and for future fusion reactors. DOE

N83-30241# California Univ., Livermore. Lawrence Livermore Lab.
STUDYING ELECTRON DISTRIBUTIONS USING THE TIME-RESOLVED FREE-BOUND SPECTRA FROM CORONAL PLASMAS
D. L. Matthews, R. L. Kauffman, J. D. Kilkenny (Imperial Coll.), and R. W. Lee (Imperial Coll.) Nov. 1982 25 p refs Presented at the 24th Am. Phys. Soc. Ann. Meeting, New Orleans, 1-5 Nov. 1982
(Contract W-7405-eng-48)
(DE83-006569; UCRL-88313; CONF-821128-4) Avail: NTIS HC A02/MF A01

Absorption of laser light in a plasma by inverse bremsstrahlung, I.B., can lead to anon-Maxwellian velocity distribution provided the electron-electron collision frequency is too low to equilibrate the velocity distribution in the coronal plasma region of a laser heated aluminum disk by measuring the radiation recombination continuum. The experiments are performed using lambda/sub L/ = 0.532 (SIGMA) m laser light at intensities of approx. 10(16) W/cm (2). Such parameters are predicted to produce conditions suitable for a nonthermal electron distribution. The shape of the K-shell recombination radiation has been measured using a time resolved X ray spectrograph. The electron distribution is determined from deconvolution of the recombination continuum shape. DOE

N83-30242# Oak Ridge National Lab., Tenn. Fusion Energy Div.
NEUTRAL BEAM HEATING IN STELLARATORS: A NUMERICAL APPROACH
S. A. Hokin, J. A. Rome, T. O. Hender, and R. H. Fowler Mar. 1983 27 p refs
(Contract W-7405-eng-26)
(DE83-010458; ORNL/TM-8530) Avail: NTIS HC A03/MF A01

Calculation of neutral beam deposition and heating in stellarators is complicated by the twisty stellarator geometry and by the usual beam focusing, divergence, and cross-sectional shape considerations. A new deposition code was written that takes all of this geometry into account. A unique feature of this code is that it gives particle deposition in field line coordinates, enabling the thermalization problem to be solved more efficiently. DOE

N83-30243# General Atomic Co., San Diego, Calif.
THEORY OF CURRENT DRIVE WITH LOWER HYBRID WAVES
C. S. Liu and V. S. Chan Jun. 1982 15 p refs Presented at the Chalmers Symp. on Plasma Theory and Expt., Aspenasgarden, Sweden, 16-18 Jun. 1982
(Contract DE-AT03-76ET-51011)
(DE82-017216; GA-A-16787; CONF-820694-2) Avail: NTIS HC A02/MF A01

A mechanism is proposed whereby high phase velocity lower hybrid waves can interact with lower parallel velocity electrons

through nonlinearly excited plasma waves. Significant steady state current can be sustained by the RF after the ohmic field is turned off in a Tokamak provided the initial electron distribution has a substantial runaway tail. DOE

N83-30244# Los Alamos Scientific Lab., N. Mex.
SELF-CONSISTENT ELECTRON TRANSPORT IN COLLISIONAL PLASMAS
Rodney J. Mason 1982 20 p refs Presented at the Los Alamos/CEA Appl. Phys. Conf., Paris, 29-23 Apr. 1982
(DE82-014083; LA-UR-82-1034; CONF-820429-2) Avail: NTIS HC A02/MF A01

A self consistent scheme was developed to model electron transport in evolving plasmas of arbitrary classical collisionality. The electrons and ions re treated as either multiple donor cell fluids, or collisional particles in cell. Particle suprathermal electrons scatter off ions, and drag against fluid background thermal electrons. The background electrons undergo ion friction, thermal coupling, and bremsstrahlung. The components move in self-consistent advanced E fields, obtained by the Implicit Moment Method, which permits delta t > >1/omega sub p and delta x > > lambda sub D offerring a .01 to .001 fold speed up over older explicit techniques. The fluid description for the background plasma components permits the modeling of transport in systems spanning more than a 10 to the 7th power fold change in density, and encompassing contiguous collisional and collisionless regions. DOE

N83-30245# Los Alamos Scientific Lab., N. Mex.
METHODS FOR TWO-DIMENSIONAL CHARGED-PARTICLE TRANSPORT IN COLLISIONLESS PLASMAS
D. W. Forslund and J. U. Brackbill 1982 39 p refs Presented at the Los Aiamos/CEA Appl. Phys. Conf., Paris, 19-23 Apr. 1982
(Contract W-7405-eng-36)
(DE82-014044; LA-UR-82-1063; CONF-820429-3) Avail: NTIS HC A03/MF A01

A new method for modeling multidimensional charged particle transport in self consistent electric and magnetic fields is presented. An implicit formulation of the Vlasov-Maxwell equations removes the usual restrictions on time and mesh spacing so that low frequency and large scale length plasma phenomena can be studied. The improvement over previous explicit methods is literally orders of magnitude. As developed in a new code VENUS, we describe the algorithm and its stability and accuracy properties. This method allows one to bridge the enormous gap between the high frequency short scale length collective plasma phenomena and the slow time scales and large scale lengths of hydrodynamic processes. It should result in a significant improvement of phenomenological models of transport in existing hydrodynamics codes. Applications are given that include the discovery of the important role of self generated magnetic fields in the convective transport of electron energy in laser irradiated plasmas. DOE

N83-30246# Los Alamos Scientific Lab., N. Mex.
STATISTICAL MAGNETOHYDRODYNAMICS AND REVERSED-FIELD-PINCH QUIESCENCE
Leaf Turner 1982 24 p refs Presented at the Conf. on New Trends in Unconventional Approaches to Magnetic Fusion, Stockholm, 16-18 Jun. 1982 Submitted for publication
(Contract W-7405-eng-36)
(DE82-015740; LA-UR-82-1358; CONF-820644-1) Avail: NTIS HC A02/MF A01

A statistical model of a bounded, incompressible, cylindrical magnetofluid is presented. This model predicts the presence of magnetic fluctuations about a cylindrically-symmetric, Bessel-function-model, mean magnetic field, which satisfies del x B = mu B. As theta 1.56, the model predicts that the significant region of the fluctuation spectrum narrows down tc a single (coherent) m = 1 mode. An analog between the Debye length of an electrostatic plasma and 1/mu suggests the physical validity of the model's predictions of delta B(r) delta B(r') when /r - r'/ 1/mu. DOE

N83-30247# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.
PHYSICAL AND ENGINEERING CONSTRAINTS FOR TOKAMAK REACTORS AND HELICAL COILS
R. E. Potok, H. Becker, L. Bromberg, D. Cohn, N. Diatchenko, P. B. Roemer, and J. E. C. Williams Jun. 1982 146 p
(Contract DE-AC02-78ET-51013)
(DE82-019251; DOE/ET-51013/39; PFC/RR-82-10) Avail: NTIS HC A07/MF A01

An analytical and numerical analysis is presented for a Tokamak reactor with a set of helical coils added in order to eliminate plasma disruptions. A number of design options for the helical coils are considered (resistive or superconducting coils, plasement internal or external to the toroidal field magnets, continuous or modular coils, and type of winding law). The optimum helical configuration is found to be a set of resistive, continuous, 1=2 stellarator coils which are internal to the toroidal field coils. A set of scaling laws is then developed for this optimal configuration, and a series of parametric scans are done with varying assumptions for the forces on the helical coils and the ratio of helical coil transform to plasma transform (M*). DOE

N83-30248# California Univ., Berkeley. Lawrence Berkeley Lab.
DENSITY AND POTENTIAL MEASUREMENTS IN AN INTENSE ION-BEAM-GENERATED PLASMA Ph.D. Thesis
Norman Edwin Abt May 1982 123 p refs
(Contract DE-AC03-76SF-00098)
(DE82-018803; LBL-13935) Avail: NTIS HC A06/MF A01

Neutral beams are created by intense large area ion beams which are neutralized in a gas cell. The interaction of the beam with the gas cell creates a plasma. Such a plasma is studied here. The basic plasma parameters, electron temperature, density, and plasma potential, are measured as a function of beam current and neutral gas pressure. These measurements are compared to a model based on the solution of Poisson's equation. Because of the cylindrical geometry the equation cannot be solved analytically. Details of tho numerical method are presented. DOE

N83-30249# California Univ., Livermore. Lawrence Livermore Lab.
TIME-RESOLVED X-RAY LINE DIAGNOSTICS OF LASER-PRODUCED PLASMAS
Dennis L. Matthews, Robert L. Kauffman, J. D. Kilkenny (Imperial Coll.), and R. W. Lee (Imperial Coll.) 1982 14 p refs Presented at the 12th Anomalous Absorption Conf., Santa Fe, N.Mex., 10-13 May 1982
(Contract W-7405-eng-48; Grant NATO-292.81)
(DE82-015165; UCRL-87422; CONF-820553-2) Avail: NTIS HC A02/MF A01

The underdense plasma conditions of laser irradiated disks using K X rays from highly ionized ions were examined. A 900 ps laser pulse of 0.532 micrometers light is used to irradiate various Z disks which were doped with low concentration of tracer materials. The tracers whose Z's range from 13 to 22 are chosen so that their K X ray spectrum is sensitive to typical underdense plasma temperatures and densities. Spectra are measured using a time resolved crystal spectrograph recording the time history of the X ray spectrum. A spatially resolved, time integrated crystal spectrograph also monitors the X ray lines. Large differences in A1 spectra are observed when the host plasma is changed from SiO2 to PbO or In. Spectra are presented along with preliminary analysis of the data. DOE

N83-30250# California Univ., Livermore. Lawrence Livermore Lab.
INERTIAL FUSION: AN ENERGY-PRODUCTION OPTION FOR THE FUTURE
Jack Hovingh, John H. Pitts, Michael J. Monsler, and Gerald R. Grow May 1982 18 p refs Presented at the 17th Intersoc. Conversion Eng. Conf., Los Angeles, 8-13 Aug. 1982
(Contract W-7405-eng-48)
(DE82-019245; UCRL-87671; CONF-820814-20) Avail: NTIS HC A02/MF A01

The inertial confinement approach to fusion energy is discussed. After explaining the fundamentals of fusion, they describe the state of the art of fusion experiments, emphasizing the results achieved through the use of neodymium doped glass lasers at Lawrence Livermore National Laboratory and at other laboratories. They highlight recent experimental results confirming theoretical predictions that short wavelength lasers have excellent energy absorption on fuel pellets. Compressions of deuterium tritium fuel of over 100 times liquid density have been measured, only a factor of 10 away from the compression required for a commercial reactor. Finally, it is shown how to exploit the unique characteristics of inertial fusion to design reactor chambers that have a very high power density and a long life, features that the authors believe will eventually lead to fusion power at a competitive cost. DOE

N83-30251# General Atomic Co., San Diego, Calif.
LASER-FLUORESCENCE MEASUREMENTS OF HYDROGEN AND METAL DENSITIES IN THE DOUBLET 3 TOKAMAK
C. H. Muller, III, D. R. Eames, and K. H. Burrell Jan. 1983 23 p refs Presented at the 29th Natl. Symp. of the Am. Vacuum Soc., Baltimore, 15-19 Nov. 1982
(Contract DE-AT03-76ET-51011)
(DE83-008499; GA-A-16853) Avail: NTIS HC A02/MF A01

A general overview of the Doublet III laser-spectroscopy program is presented. Measurements of titanium and deuterium in Doublet III are present along with recent laboratory results. Sputtering of the vacuum walls by energetic charge exhange neutrals from the plasma center appears to be responsible for the observed Ti impurities. Resonance fluorescence scattering from deuterium atoms near the plasma center was observed using a broadband dye laser and a narrow-band detector. The feasibility of determining ion temperatures using this technique is discussed. Using the measured deuterium densities, the local electron particle confinement time was calculated. Laboratory measurements of carbon and oxygen densities using two photon laser excitation and FeI speed distributions (temperatures) using a laser double-pulse excitatioon technique are shown to be applicable to the Tokamak conditions of Doublet III. Author

N83-30252# College of William and Mary, Williamsburg, Va. Dept. of Physics.
MAJOR DISRUPTIONS, INVERSE CASCADES AND THE STRAUSS EQUATIONS
David Montgomery 1982 18 p refs Presented at the Intern. Conf. on Plasma Phys., Goteborg, 9-15 Jun. 1982 Submitted for publication
(Contract DE-AS05-76ET-53045)
(DE82-017188; CONF-820618-9) Avail: NTIS HC A02/MF A01

Current carrying plasmas in a strong dc magnetic field are subject to violent disruptions above certain thresholds. At present difficult to verify, explanations are typically sought in terms of tearing modes. An alternative explanation is in terms of inverse magnetic helicity cascades, generated from a variety of possible sources of small scale MHD turbulence. Strongly anisotropic MHD plasmas may be described by the Strauss equations. Indications of turbulent inverse, cascade behavior for the Strauss equations are sought, in parallel with earlier examples from MHD and fluid mechanics. DOE

N83-30253# Texas Univ., Austin. Inst. for Fusion Studies.
TOPICS IN PLASMA INSTABILITIES: TRAPPED-PARTICLE MODES AND MHD
M. N. Rosenbluth Jun. 1982 29 p refs Presented at the Intern. Conf. on Plasma Phys., Goteborg, 7 Jun. 1982
(Contract DE-FG05-80ET-53088)
(DE82-019194; DOE/ET-53088/62; IFSR-62; CONF-820618-10) Avail: NTIS HC A03/MF A01

A theory for trapped particle modes in tandem mirrors is given. DOE

N83-30254# General Atomic Co., San Diego, Calif.
THEORY OF RUNAWAY-CURRENT SUSTAINMENT BY LOWER-HYBRID WAVES
C. S. Liu, V. S. Chan, D. K. Bhadra, and R. W. Harvey Jun. 1982 9 p refs Presented at the Intern. Conf. on Plasma Phys., Goteborg, 7 Jun. 1982
(Contract DE-AT03-76ET-51011)
(DE82-017213; GA-A-16786; CONF-820618-8) Avail: NTIS HC A02/MF A01

A mechanism is proposed whereby high phase velocity lower hybrid waves can interact with lower parallel velocity electrons through nonlinearly excited plasma waves. Significant steady state current is sustained by the RF after the ohmic field is turned off in a Tokamak provided the initial electron distribution is in the runaway regime with density below a critical value. DOE

N83-30255# California Univ., Livermore. Lawrence Livermore Lab.
PRELIMINARY CONCEPTUAL DESIGN STUDY OF A SUPPRESSED-FISSION TOKAMAK HYBRID
D. Grady, D. Berwald, J. Garner, D. Jassby, J. Karbowski, J. DeVan, J. D. Lee, and R. W. Moir Jan. 1983 52 p refs
(Contract W-7405-eng-48)
(DE83-008428; UCID-19733) Avail: NTIS HC A04/MF A01

A preliminary design concept for a commercial size Tokamak fusion breeder with a suppressed fission blanket and emphasis on U-233 breeding were formulated. The design is based upon a similar tandem mirror hybrid concept and addresses particular concerns relating to the use of a Tokamak for the suppressed fission blanket application. The single most important departure from the tandem mirror reference blanket concept is the substitution of FLIBE for the liquid lithium used for cooling and in-situ tritium breeding. A concern for excessive MHD-related problems drove the decision to replace the more highly conductive lithium. As a result of the coolant selection, material compatibility issues mandated changes in the composition of the mobile fuel pellets. In addition, the higher operating temperatures associated with the FLIBE placed more strigent constraints on structural requirements and reduced several design margins. DOE

N83-30256# Fraunhofer-Inst. fuer Angewandte Festkoerperphysik, Freiburg (West Germany).
PLASMA ETCHING, PROCESSES AND DIAGNOSTIC Final Report, Apr. 1982
Konrad Eisele Bonn Bundesministerium fuer Forschung und Technologie Apr. 1983 48 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-041; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 10

Various gases were tested for their ability to etch silicon anisotropically. Attempts to improve the selectivity when etching SiO2 did not lead to new processes. Linewidths of 0.5 microns were obtained in aluminum. The frequency of the plasma excitation influences etch rate, profile, and selectivity. Plasma mass spectroscopy is better suited for diagnostic purposes than neutral particle spectroscopy. Plasma potentials of various gases were examined. This potential accelerates the ions in anode coupled etching and must be considered when external bias is applied to influence the etch profile. Author (ESA)

N83-30257# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.
ION ACCELERATION IN THE PLASMA FOCUS
R. Deutsch Sep. 1982 46 p refs
(IPF-82-6) Avail: NTIS HC A03/MF A01

Experimental data were used to estimate the time dependence of the current density in the plasma focus. The electromagnetic field was determined from the Maxwell equations. Acceleration in the compression phase, in the expansion phase and during the evolution of the m=0 instability was studied. It is shown that the appearance of fast self focused quasineutral electron beams, as a result of the betatron acceleration, has a decisive importance in the ion acceleration during the m=0 constriction. Models for

electromagnetic ion acceleration are described for each phase.
Author (ESA)

N83-30258# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.
NUMERICAL SOLUTION OF PLASMA WAVE PHENOMENA
U. Erz, E. Raeuchle, and K. Weixelbaum Jun. 1982 25 p refs Presented at 1982 Intern. Conf. on Plasma Phys., Goteborg, 9-15 Jun. 1982
(IPF-82-8) Avail: NTIS HC A02/MF A01

The numerical solution of the normalized Vlasov equations for electrons and ions using the splitting method and finite element methods is applied to characteristic examples of wave propagation in plasmas. Linear and nonlinear electrostatic waves, bounce effects of electrons and ions, sideband instabilities, Langmuir solitons and current driven turbulence are investigated.
Author (ESA)

N83-30259# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.
SELF ORGANIZATION PHENOMENA IN THE PLASMA FOCUS
R. Deutsch, W. Grauf, H. Herold, and H. Schmidt Jun. 1982 15 p refs
(IPF-82-9) Avail: NTIS HC A02/MF A01

The structure of the final minimum energy state of the focus plasma was derived using Taylor's relaxation theory, for an axiosymmetric configuration. A system of eddies superimposed on the reversed field pinch structure is obtained. Analysis shows that the intensity and the structure of the eddies depend on the total current. The dimensions of the eddies are determined by the ratio between the compressed longitudinal field and the azimuthal field of the current. Although dissipative effects and the pressure and kinetic energies are neglected by the theory, results are confirmed by experiment. Author (ESA)

N83-30260# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.
THE INFLUENCE OF THE DEVIATION FROM THE EQUILIBRIUM DEUTERON DISTRIBUTION ON THE NEUTRON SPECTRA IN LINEAR PINCH GEOMETRIES
R. Deutsch, H. Herold, H. J. Kaeppeler, and H. Schmidt Jul. 1982 25 p refs
(IPF-82-10) Avail: NTIS HC A02/MF A01

In order to analyze the influence of the deviation from the equilibrium distribution of the fast deuterons on the neutron spectrum, the limiting case, corresponding to a two dimensional monoenergetic deuteron distribution, was studied. The appearance of a pronounced peak in the side-on spectra at neutron energy = 2.5 MeV is noted. There is good agreement between theory and experiment, if relaxation processes are taken into account.
Author (ESA)

N83-30261# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.
BETA INCREASE IN A BELT PINCH PLASMA BY FAST MAGNETOSONIC WAVE HEATING
V. Erckmann, A. Mayer, G. Mueller, K. Schwoerer, M. Thumm, and R. Wilhelm Sep. 1982 13 p refs Presented at 9th Intern. Conf. on Plasma Phys. and Controlled Nucl. Fusion Res., Baltimore, 1-8 Sep. 1982
(IPF-82-11; IAEA-CN-41/M-5-2) Avail: NTIS HC A02/MF A01

Additional heating of strongly elongated high Beta plasmas by fast magnetosonic wave absorption at the second harmonic of the ion cyclotron frequency was investigated. When the resonance layer is located in the plasma center, wave absorption with an energy flux of 50 MW/sqm is observed. The value on the magnetic axis increases from 30% to 70%, indicating a localized power deposition. The ion temperature grows nearly linearly with increasing incident wave power. Electron temperature is unaffected. When the resonance surface is shifted from the magnetic axis towards the plasma boundary, plasma heating is reduced by a factor of 2 and the central Beta remains constant during the RF-heating pulse. In corresponding hydrogen discharges, where the resonance region is located outside the plasma, no heating is observed. During the RF-heating process and the following energy decay the plasma passes through a sequence of flux-conserving equilibria.
Author (ESA)

N83-30262# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.
INVESTIGATION OF THE NEUTRON PRODUCTION PHASES OF A LARGE PLASMA FOCUS DEVICE
H. Herold, L. Bertalot, R. Deutsch, W. Grauf, U. Jaeger, H. J. Kaeppeler, F. Lepper, T. Oppenlaender, H. Schmidt, R. Schmidt et al Sep. 1982 11 p refs Presented at 9th Intern. Conf. on Plasma Phys. and Controlled Nucl. Fusion Res., Baltimore, 1-8 Sep. 1982
(IPF-82-12; IAEA-CN-41/N-6-1) Avail: NTIS HC A02/MF A01

Plasma dynamic behavior and neutron production in large focus devices with pinch currents of 1 MA was studied. A hybrid code based on the analytical computer algorithm REDUCE was developed to treat turbulent plasma motion. Experimental diagnostics included Schlieren photographs, reaction proton localization with pinhole cameras and neutron measurements with Ag-counters and scintillators. Data concern the 280 kJ, 60 kV operational mode of the POSEIDON plasma focus. It is shown that for large pinch currents, neutron emission also appears before m = 0 onset in the intermediate phase. This part of the neutron production becomes predominant for very large currents. The lifetime of this intermediate phase strongly increases with increasing current. According to theory, the late phase of the focus is governed by strong turbulence phenomena. The lifetime of the turbulence packets is approximately 150 nsec and explains the long lasting neutron emission in this phase. Author (ESA)

N83-30263# National Science Foundation, Washington, D.C. Div. of Policy Research and Analysis.
A WORKSHOP ON ALTERNATIVE FUSION CONCEPTS AND THEIR UTILIZATION PROJECTIONS
1982 264 p Workshop held in Washington, D.C., 9-10 Jan. 1980
(PB83-157966; NSF/PRA-82045; NSF-82-78) Avail: NTIS HC A12/MF A01 CSCL 18A

The role of alternate fusion concepts in overall fusion energy development is intimately related to the strategy of the fusion research and development program. Projection of fusion utilization is highly uncertain because the need for fusion energy depends on several factors: U.S. energy demand; conventional energy supplies; and the availability and utility of other alternate energy resources. The criteria which a fusion reactor must meet to compete economically with other energy resources are discussed and various options and alternative strategies for the development of fusion energy are proposed. The materials problem is recognized as a key problem of fusion research and more indepth materials studies should be carried out on the problem of first wall/blanket/coolant combinations. GRA

N83-30264# Science Research Council, Chilton (England).
SPATIALLY AND SPECTRALY RESOLVED FILAMENTARY STRUCTURES IN THE (3/2)OMEGA 0 EMISSION FROM LASER PRODUCED PLASMAS
Zunqi Lin, O. Willi, and P. T. Rumsby 1982 28 p refs
(PB83-165969; RL-82-010) Avail: NTIS HC A03/MF A01 CSCL 29I

This study was conducted to explore the problem of filamentation of laser light in the underdense plasma corona surrounding ablatively imploded spherical targets, a phenomenon which may prevent the realization of laser-driven fusion schemes. Preliminary observations were made of filamentary structures in the (3/2) (omega sub 0) emission from microballoon targets irradiated in the ablative mode. Time integrated spectroscopy showed double and single peaked (3/2)(omega sub 0) emission spectra. A simple model for the growth and collapse of filaments was based on the movement of the density contours at the bottom of the filament with large velocity. Here the laser intensity was high and various decay instabilities and scattering processes took place. In particular

the two plasmon decay instability occurred where the electron density was nc/4, a region of (3/2)(omega sub 0) emission. The model was consistent with the experimentally observed spectra and predicted the type of omega sub 0 and 2 omega sub 0 that should be observed in future experiments. GRA

N83-30265# Israel Atomic Energy Commission, Yavneh. Soreq Nuclear Research Center.
LASER-FUSION (FOR PEDESTRIANS)
S. Eliezer Feb. 1982 49 p refs
(PB83-166470; IA-137) Avail: NTIS HC A03/MF A01 CSCL 20I

The physics of laser fusion is described on an elementary level. The interaction physics between laser and matter leading to thermonuclear burn is summarized. In addition to the laser-plasma physics, the Nd high power pulsed laser is described. The concept of reactors for laser fusion and the necessary laser system are discussed. GRA

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

N83-30266 Stanford Univ., Calif.
EFFECTS OF SURFACE PREPARATION ON THE PROPERTIES OF SINGLE CRYSTAL CdTe JUNCTIONS Ph.D. Thesis
Jan Gustav Werthen 1982 147 p
Avail: Univ. Microfilms Order No. DA8220561

Metal/CdTe junctions formed on cleaved surfaces exhibit diode characteristics that obey the thermionic emission model modified by the effects of a thin interfacial oxide layer. The measured barrier height depends on metal work function and reached 0.99 V in an Al/CdTe junction. Etched surfaces result in metal/CdTe junctions with a barrier height of 0.7 V. No dependence of the barrier height on the metal work function is observed. Heat treatment of a polished and etched surface results in metal/CdTe junctions with characteristics similar to those of junctions formed on cleaved surfaces. Dependence of barrier height on metal work function is observed. Auger analysis indicated the presence of excess Te and detectable concentrations of Br on the etched surfaces, whereas no excess Te or Br was detected on the heat treated surface. Solar efficiencies for ITO/CdTe heterojunctions are discussed. Dissert. Abstr.

N83-30267 Texas Univ., Austin.
EXPERIMENTAL DETERMINATION OF THE THIN FILM GROWTH MECHANISM Ph.D. Thesis
Byeong Soo Lim 1982 121 p
Avail: Univ. Microfilms Order No. DA8227681

Measurements were made to characterize solid state thin film interactions in the silicon system with the metals palladium, magnesium, and vanadium. Silicon wafers of (100) and (111) orientation were used as cold substrates, and the metals were deposited in thicknesses of 2000 A to 10000 A. The analysis techniques included the following: X-ray determination of silicide formation, Auger electron spectroscopy during depth profiling to determine silicide location, and secondary ion mass spectroscopy (SIMS) to find the extent of isotope separation during silicide growth. All three silicides were found to follow the parabolic (time)(1/2)type, growth behavior, isotope separation of the mobile species in palladium and magnesium - silicon couples was observed. From the observed growth rate, the isotope separation of the mobile species in the silicide layer, and the X-ray analysis, it is concluded that the growth of Pd2Si entails the lattice diffusion of silicon, whereas, Mg2Si grows via the grain boundary diffusion of magnesium. The growth mechanism of the VSi2 is believed to be mixed between the two processes. Dissert. Abstr.

N83-30268*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
GaAs SCHOTTKY BARRIER PHOTO-RESPONSIVE DEVICE AND METHOD OF FABRICATION Patent Application
Charles Z. Leinkram (Howard Univ., Washington, D.C.), Olatunji Okunola (Howard Univ., Washington, D.C.), and George E. Alcorn, inventors (to NASA) Filed 24 Jun. 1983 11 p
(NASA-Case-GSC-12816-1; US-Patent-Appl-SN-507625) Avail: NTIS HC A02/MF A01 CSCL 20L

A gallium arsenide photo-responsive device is provided with an intermediate, transparent layer of a refractory metal or alkaline earth metal forming a tenacious bond between a non-hydroscopic oxide layer and a noble metal Schottky barrier layer. The device has a gallium arsenide substrate with a predetermined type conductivity and a gallium arsenide epitaxial layer with the same type conductivity but a lower charge carrier concentration grown on the substrate. The oxide layer is formed to cover the epitaxial layer, and the transparent metal layer followed by the noble metal layer are deposited upon the oxide layer. An interdigitated ohmic contact is then formed upon the noble metal layer. NASA

N83-30269*# National Aeronautics and Space Administration. Pasadena Office, Calif.
METHOD FOR GROWING LOW DEFECT, HIGH PURITY CRYSTALLINE LAYERS Patent Application
Andrew D. Morrison (JPL, California Inst. of Tech., Pasadena) and Taher Daud, inventors (to NASA) (JPL, California Inst. of Tech., Pasadena) Filed 24 Jun. 1983 13 p
(Contract NAS7-100)
(NASA-Case-NPO-15813-1; US-Patent-Appl-SN-502624) Avail: NTIS HC A02/MF A01 CSCL 20L

The purity and perfection of a semiconductor is improved by depositing a patterned mask of a material impervious to impurities of the semiconductor on a surface of a blank. When a layer of semiconductor is grown on the mask, the semiconductor will first grow from the surface portions exposed by the openings in the mask and will bridge the connecting portions of the mask to form a continuous layer having improved purity, since only the portions overlying the openings are exposed to defects and impurities. The process can be reiterated and the mask translated to further improve the quality of grown layers. NASA

N83-30270# Technische Hogeschool, Delft (Netherlands). Lab. for Process Equipment.
SOLID-LIQUID CONTACTING IN INDUSTRIAL CRYSTALIZERS AND ITS INFLUENCE ON PRODUCT SIZE DISTRIBUTION
P. A. M. Grootscholten Aug. 1982 202 p refs
(WTHD-150) Avail: NTIS HC A10/MF A01

The population balance concept, nucleation kinetics, growth and dissolution of sodium chloride crystals, a pilot plant crystallizer with double radial inlet are discussed, and the effect of crystallizer geometry on crystallizer performance. Author

N83-30271*# McDonnell-Douglas Research Labs., St. Louis, Mo.
ADVANCED METHODS FOR PREPARATION AND CHARACTERIZATION OF INFRARED DETECTOR MATERIALS Final Report, 30 Sep. 1981 - 15 Feb. 1983
J. G. Broerman, B. J. Morris, and P. J. Meschter 15 Feb. 1983 28 p refs
(Contract NAS8-33107)
(NASA-CR-170798; NAS 1.26:170798; MDC-Q0796) Avail: NTIS HC A03/MF A01 CSCL 20L

Crystals were prepared by the Bridgman-Stockbarger method with a wide range of crystal growth rates and temperature gradients adequate to prevent constitutional supercooling under diffusion-limited, steady-state, growth conditions. The longitudinal compositional gradients for different growth conditions and alloy compositions were calculated and compared with experimental data to develop a quantitative model of solute redistribution during the crystal growth of the alloys. Measurements were performed to ascertain the effect of growth conditions on radial compositional gradients. The pseudobinary HgTe-CdTe constitutional phase diagram was determined by precision differential-thermal-analysis measurements and used to calculate the segregation coefficient of Cd as a function of x and interface temperature. Experiments were conducted to determine the ternary phase equilibria in

selected regions of the Hg-Cd-Te constitional phase diagram. Electron and hole mobilities as functions of temperature were analyzed to establish charge-carrier scattering probabilities. Computer algorithms specific to Hg(1-x)CdxTe were developed for calculations of the charge-carrier concentration, charge-carrier mobilities, Hall coefficient, and Dermi Fermi energy as functions of x, temperature, ionized donor and acceptor concentrations, and neutral defect concentrations. Author

N83-30272# IBM Watson Research Center, Yorktown Heights, N.Y. Photoemission and Surface Physics Group.
SPECTROSCOPIC STUDIES OF THE ELECTRONIC STRUCTURE OF METAL-SEMICONDUCTOR AND VACUUM-SEMICONDUCTOR INTERFACES Final Report, 15 Jun. 1981 - 15 Sep. 1982
Franz J. Himpsel 31 Dec. 1982 30 p refs
(Contract F49620-81-C-0089; AF Proj. 2306)
(AD-A125621; AFOSR-83-0104TR) Avail: NTIS HC A03/MF A01 CSCL 20/12

The electronic structure and properties of semiconductor surfaces and interfaces as well as relevant metal and semiconductor materials have been investigated under this contract. The emphasis has been on elucidating the electronic properties of these materials and their interfaces, e.g., semiconductor-oxide and metal-oxide interfaces which are of importance in such semiconductor devices as MOSFETS, CCD devices, photovoltaic devices, etc. Extensive studies have been performed as a function of surface preparation (including laser annealing and molecular beam epitaxy) doping, thickness of adsorbed overlayers, etc. The principal techniques used have been photoelectron spectroscopy using synchrotron radiation and inverse photoemission. Author (GRA)

N83-30273# California Univ., Livermore. Lawrence Livermore Lab.
THEORETICAL MODELING OF EMP EFFECTS IN SEMICONDUCTOR JUNCTION DEVICES Final Report
J. H. Yee, W. J. Orvis, and L. C. Martin Kirtland AFB, N. Mex. AFWL Feb. 1983 42 p refs
(Contract W-7705-eng-48; AF Proj. 3763)
(AD-A125976; AFWAL-TR-82-91) Avail: NTIS HC A03/MF A01 CSCL 20/12

This report discusses various damage mechanisms and their effects on the performance of semiconductor devices, and some of the important theoretical models which are used to describe second breakdown phenomena. The dominant mechanism responsible for the occurrence of second breakdown is probably the thermal excitation of electrons from a device's valence band (thermal mode second breakdown); conclusions from theoretical calculations based on three different approximations seem to support this model. Current mode breakdown, another form of second breakdown, is discussed in terms of the role it plays in determining the shape of the threshold failure power curve. The purpose of this investigation is, therefore, to assess the existing models and known mechanisms which can cause damage to a p-n junction device in an electromagnetic pulse environment. GRA

N83-30274# Texas Univ., Austin. Dept. of Chemistry.
SEMICONDUCTOR ELECTRODES. 50: EFFECT OF MODE OF ILLUMINATION AND DOPING ON PHOTOELECTROCHEMICAL BEHAVIOR OF PHTHALOCYANINE FILMS Technical Report, 1 Sep. 1982 - 1 Aug. 1983
Patrick Leempoel, Fu-Ren Fan, and Allen J. Bard 25 Feb. 1983 46 p refs Submitted for publication
(Contract N00014-78-C-0592; NR Proj. 051-693)
(AD-A125856; TR-28) Avail: NTIS HC A03/MF A01 CSCL 20/12

The behavior of photoelectrochemical (PED) cells composed of Sno2 or Pt electrodes with coatings of different phthalocyanines (Pc) -H2PC, ZnPc, MgPc, (CuPc, InPc) 1 was investigated. Spectral sensitization at the Sn02/Pc interface leads to photooxidation currents, while efficient photoreduction occurs at the Pc/solution interface through bulk generation of charge carriers. The presence of both anodic and cathodic photocurrents leads to different net photocurrent responses for back and front side illumination, especially with thicker films. The efficiency of the reduction process was sensitive to the potential of the redox couple in solution and maximized when E redox was about 0.37V for N2Pc, ZnPc and -MgPc. A dramatic improvement of the photoelectrochemical behavior of the coating results from doping with an electron acceptor (e.g.,o-chloranil) and quantum yields as high as 4.6% were measured for Pt/H2Pc electrodes. GRA

N83-30275# Illinois Univ., Urbana. Coordinated Science Lab.
EXPERIMENTAL STUDIES OF LATERAL ELECTRON TRANSPORT IN GALLIUM ARSENIDE-ALUMINUM GALLIUM ARSENIDE HETEROSTRUCTURES Ph.D. Thesis
Mark Robert Keever Dec. 1982 225 p refs
(Contract N00014-76-C-0806)
(AD-A125858; R-975; UILU-ENG-82-2241) Avail: NTIS HC A10/MF A01 CSCL 20/12

The electron-transport characteristics of modulation-doped GaAs-AlxGa1-xAs1 heterostructures have been measured over a wide range of temperatures using a diverse set of device structures. Short voltage pulses were used to apply a broad range of lateral (parallel to the interface) electric fields and the resulting current-field characteristics were determined using a sampling oscilloscope and x-y recorder. It was observed that the high electron mobility in these structures initially increased as the electric field was increased from zero. The low-field mobility reached a maximum at fields below 500 V/cm and then dropped quickly at low termperatures for increasingly higher electric fields. At higher temperatures (200 K to 300 K) there was comparatively little change in the mobility for fields up to 2 kV/cm. For higher fields (avove 2 kV/cm) it was found that the electrons could gain enough energy to be thermionically emitted over the conduction-band discontinuity from the high-mobility GaAs to the low-mobility AlGaAs. This real-space transfer (RST) of electrons resulted in current saturation or varous degrees of negative differential resistance (NDR) in the samples being studied. It was demonstrated that the new real-space transfer mechanism could be used in the creation of fast electron switching and storage devices and also high-frequency oscillators. GRA

N83-30276# Scientific Research Associates, Inc., Glastonbury, Conn. Solid State Device Research Dept.
SEMICONDUCTOR MATERIALS FOR HIGH FREQUENCY SOLID STATE SOURCES Quarterly Progress Report
Harold L. Grubin 9 Mar. 1983 7 p
(Contract N00014-82-C-0697; ARPA Order 4599)
(AD-A126242; SRA-R920016-1) Avail: NTIS HC A02/MF A01 CSCL 20/14

The broad goal of the subject contract is to suggest candidate materials for high frequency device operation. During the initial phase of the study, attention has been focused on defining the general role of the band structure and associated scattering processes in determining the response of semiconductors to transient high-speed electrical signals. Moments of the Boltzmann transport equation form the basis of the study, and the scattering rates define the semiconductor under study. The selection of semiconductor materials proceeds from a set of simple, yet significant, set of scaling principles. During the first quarter scaling was associated with what can formally be identified as velocity invariants, but which in more practical terms identifies the relative speed advantages of e.g., InP over GaAs. GRA

N83-30277# Mayo Clinic, Rochester, Minn. Special Purpose Processor Development Group.
LEADLESS CHIP CARRIER PACKAGING AND CAD/CAM (COMPUTER-AIDED DESIGN/COMPUTER-AIDED MANUFACTURING) SUPPORTED WIRE WRAP INTERCONNECT TECHNOLOGY FOR SUBNANOSECOND ECL (EMITTER COUPLED LOGIC) Interim Technical Report, 1 Jul. 1981 - 30 Jun. 1982
Barry K. Gilbert Wright-Patterson AFB, Ohio AFWAL Dec. 1982 236 p refs
(Contract F33615-79-C-1875; AF Proj. 6096)
(AD-A126156; AFWAL-TR-82-1159) Avail: NTIS HC A11/MF A01 CSCL 09/1

This document is the third year interim report for a four-year program to refine and develop Computer-Aided Design protocols for implementation of subnanosceond Emitter Coupled Logic in High-Speed Computer Modules using a wire wrap interconnection medium. The software and user manual for implementation guides are not part of the actual report. This report describes the results of work conducted in the third year of a four year program to develop rapid methods for designing and prototyping high-speed digital processor systems using subnanosecond emitter coupled logic (ECL). The third year effort was divided into two separate sets of tasks. In Task 1, described in Sections 3 - 7 of this report, we have nearly completed development of new sets of design rules, interconnection protocols, special components, and logic panels, for a technology based upon specially designed leadless ceramic chip carriers developed at Mayo Foundation. Task 2, described in Sections 8 and IX of this report, continued the development of a comprehensive computer-aided design/ computer-aided manufacturing (CAD/CAM) software package which is specifically tailored to support the peculiar design requirements of processors operating in a high clock rate, transmission line environment, either with subnanosecond ECL components or with any other families of subnanosecond devices. GRA

N83-30278# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.

DIAGRAMS FOR THE FREE ENERGY AND DENSITY WEIGHT FACTORS OF THE ISING MODELS

R. A. Farrell, S. Favin, P. H. E. Meijer, and P. Esfandiari Jan. 1983 43 p refs Prepared in cooperation with Catholic Univ., Washington

(Contracts N00024-83-C-5301; N00014-78-C-0518)

(AD-A126295; JHU/APL/TG-1337) Avail: NTIS HC A03/MF A01 CSCL 20/2

This report describes the evaluation of the free energy of the nearest neighbor Ising model through tenth order in the inverse temperature variable (J/kT). The free energy is expressed in terms of diagrams composed of interaction bonds and vertices. An explicit list of the diagrams with 10 or fewer bonds is presented, and the unrestricted lattice constants (free multiplicities) of these diagrams are given for the cubic lattices. We employ a theorem that states that a certain sum of diagrams is zero in order to obtain the density-dependent weight factors associated with the vertices. These factors are polynomials in the density and depend on the kind of articulated vertex under consideration. Explicit denumeration of the diagrams is given for those articulated vertices of the fourth and fifth kind that are needed in the tenth order expansion. These methods reproduce the known results for the cubic lattices. GRA

N83-30279# Purdue Univ., Lafayette, Ind. Dept. of Chemistry.

DIRECT OBSERVATION OF TIME-TEMPERATURE-TRANSFORMATION CURVES FOR CRYSTALLIZATION OF ICE FROM SOLUTIONS BY A HOMOGENEOUS MECHANISM

D. R. MacFarlane, R. K. Kadiyala, and C. A. Angell Feb. 1983 15 p refs

(Contract N00014-78-C-0035)

(AD-A126044) Avail: NTIS HC A02/MF A01 CSCL 20/2

Emulsified samples of aqueous solutions of lithium chloride have been rapidly cooled to temperatures in the vicinity of the homogeneous nucleation temperature Tg and observed isothermally in a differential calorimeter to identify the time delay before the maximum crystallization rate (detected by the release of the heat of crystallization) is achieved. The locus of the time tp to reach the maximum rate at different temperatures has the classic form of the time-temperature-transformation TTT curve described in theories of homogeneous nucleation and growth. The displacement of this TTT curve to longer times and lower temperatures can be observed by increasing solution concentration. The results correlate well with much longer time observations made recently using electrical conductivity studies of thin bulk samples near their glass transition temperatures. GRA

N83-30280# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.

GRAIN-BOUNDARY-DIFFUSION MECHANISMS IN METALS

R. W. Balluffi Jun. 1982 103 p refs

(Contract DE-AC02-78ER-05002)

(DE82-018814; DOE/ER-05002/26) Avail: NTIS HC A06/MF A01

Current knowledge of the atomistic mechanisms responsible for grain boundary diffusion phenomena is reviewed. Relevant aspects of the structure of grain boundaries and the point and line defects which may exist in grain boundaries are described first. The important experimental observations are then discussed. Diffusion models are then taken up, and it is concluded that the atomic migration occurs by a point defect exchange mechanism which, in at least the vast majority of boundaries in simple metals, most likely involves grain boundary vacancies. The grain boundary sources and/or sinks required to support divergences in the atomic (vacancy) fluxes are grain boundary dislocations. Phenomena therefore occur which resemble the Kirkendall Effect in the bulk lattice in certain respects. Additional topics are discussed which include effects of boundary structure on boundary diffusion and the question of whether of not boundary diffusion is faster along migrating than stationary boundaries. DOE

N83-30281# Ames Lab., Iowa. Dept. of Chemistry.

STRUCTURES AND POLARIZED ELECTRONIC ABSORPTION SPECTRA OF DIMOLYBDENUM TETRAFORMATE CRYSTALS Ph.D. Thesis

Gary Alan Robbins Dec. 1982 164 p refs

(Contract W-7405-eng-82)

(DE83-004863; IS-T-996) Avail: NTIS HC A08/MF A01

Polarized electronic spectra in the 21,500 to 27,000 cm(+1) region are presented and discussed for the three polymorphs (original (-), new (ALPHA) and (BETA)) and for its KCl complex. The 22,000 cm(+1) band is assigned to the delta (FEMALE) delta* transition. A weak progression near 25,000 cm(+1) is assigned to the delta (FEMALE) (LC) OMEGA)* transition. A fourth, unidentified polymorph may also exist. (ALPHA)-Mo2(O2CH)4 crystallizes in monoclinic P21/c. Four molecules occupy general positions, while two molecules occupy positions of inversion symmetry. (BETA)-Mo2(O2CH)4 crystallizes in monoclinic P21/a. Evidence suggests the trend (-) > (ALPHA) (general positions) > (ALPHA) (special positions) > (BETA) in axial (intermolecular) Mo-O bond strength. The axial bonding produces effects in intramolecular Mo-O bond lengths, and Mo-Mo-O, Mo-O-C, and O-C-O bond angles. Orbital geometries of Mo and O explain the tilted chain stacking geometry found in most dimolybdenum tetracarboxylates. DOE

N83-30282# Los Alamos Scientific Lab., N. Mex.

HOT-ELECTRON DISTRIBUTION FUNCTION IN HIGH-Z MATERIALS

E. L. Lindman 1982 22 p refs Presented at the CECAM Workshop on the Flux Limeter and Heat Flow Instabilities, Orsay, France, 14 Sep. - 2 Oct. 1981

(Contract W-7405-eng-36)

(DE82-008109; LA-UR-82-500; CONF-8109121-1) Avail: NTIS HC A02/MF A01

An anaytical expression is obtained for the distribution of hot electrons as a function of distance into a cold material slab in which v/sub E/ = alpha/sub E/v/sup gamma/ and v perpendicular to = gammav/sup -beta/ are the assumed velocity dependences of the energy loss collision frequency and the scattering collision frequency and v/sub E/< < v perpendicular to. For a time independent source, a time independent solution exists with a characteristic penetration length equal to (lambda/sub E/lambda perpendicular to)/sup 1/2/ where lambda/sub E/ and lambda perpendicular to are the mean-free-paths corresponding to v/sub E/ and v perpendicular to. The distribution function at large distance from the source is proportional to v/sub alpha-3/ for v less than a critical velocity. For v greater than the critical velocity, the velocity dependence of the Maxwellian source reappears causing an exponential cutoff. DOE

N83-30283# Los Alamos Scientific Lab., N. Mex.
DEVIL'S STAIRCASE AND ORDER WITHOUT PERIODICITY IN CLASSICAL CONDENSED MATTER
Serge Aubry 1982 50 p refs Presented at the Domains and Walls Meeting, Aussois, France, 26-29 Jan. 1982
(Contract W-7405-eng-36)
(DE82-015744; LA-UR-83-1266; CONF-820150-1) Avail: NTIS HC A03/MF A01

The existence of incommensurate structures proves that crystal ordering is not always the most stable one for nonquantum matter. Some properties of structures which are obtained by minimizing a free energy are investigated in the Frenkel Kontorova and related models. It is shown that an incommensurate structure can be either quasi-sinusoidal with a phason mode or built out of a sequence of equidistant defects (discommensurations) which are locked to the lattice by the Peierls force. In that situation the variation of the commensurability ratio with physical parameters forms a complete devil's staircase with interesting physical consequences. Some general results for all structures which minimize a free energy are given. In addition to the known crystal and incommensurate structures, the existence of a new class of structures which have local order at all scale is predicted. Properties of the new class are described in physical terms and possible applications to certain amorphous or nonstoichiometric compounds are discussed. DOE

N83-30284# Arizona State Univ., Tempe. Dept. of Mechanical and Aerospace Engineering.
THERMIONIC-EMISSION MICROSCOPY OF POLYCRYSTALLINE MOLYBDENUM AND Mo-LaCrO-3 M.S. Thesis
Craig Vincent Landrith May 1982 82 p refs
(Contract DE-AC02-79ET-15419)
(DE83-006596; DOE/ET-15419/T2) Avail: NTIS HC A05/MF A01

A thermionic emission microscope was used to determine the effective work function of a molybdenum ceramic eutectic, Mo-LaCrO3. Measurements were made at temperatures up to 1881 K, and at pressures in the range 1 to 4.5 x 1/10 to the 7th power torr. The microscope measurements resulted in effective work functions which agreed well with the previous reported values. Indeed, the effective work function of a grain labeled zone 7 was found to be 4.52 +- 0.04 eV. The previous values was 4.48 +- 0.04 eV. This good agreement indicated that the microscopy was operating correctly. A new prepared material, Mo-LaCrO3 was investigated. It was found to have unstable effective work functions for a period of about 24 to 25 continuous hours of operation. The effective work function of all grains studied increased during this time. Near 25 hours the effective work functions began to fluctuate. This fluctuating phenomena was observed from the 25th hour to the 40th hour of operation. During this time the mean effective work functions (anti phi/sub e/) of four grains varied from 4.74 to 4.81 eV. DOE

N83-30285# Argonne National Lab., Ill.
FOCUSING AND IMAGING SHARP LINE X-RAY AND GAMMA-RAY SOURCES USING VARIABLE-METRIC DIFFRACTION CRYSTALS
Robert K. Smither 1982 24 p refs Presented at the 11th Texas Symp. on Relativistic Astrophys., Austin, Tex., 12 Dec. 1982
(Contract W-31-109-eng-38)
(DE83-007789; CONF-821227-1) Avail: NTIS HC A02/MF A01

A new method was devised for focusing and imaging the radiation from sharp line sources of X-rays and gamma rays, which makes use of variable metric diffraction crystals. A variable metric diffraction crystal is one in which the spacings between the crystalline planes is varied as a function of position in the crystal by either the application of a thermal gradient or by changing the composition of a two component or multiple component crystal. This change in planar spacing changes the Bragg diffraction angle for monochromatic radition as a function of position in the crystal and makes it possible to obtain focusing and in some cases imaging of a sharp line point source or parallel beam source. This new approach to focusing X-rays and gamma rays is used to design a number of gamma ray telescopes suitable for focusing the 511 keV annihilation radiation from the strong source of the center of our galaxies. DOE

N83-30286# Merck (E.), Darmstadt (West Germany). Chemische Forschung und Entwicklung.
NEMATIC LIQUID CRYSTALS FOR DISPLAY SYSTEMS Final Report, Jun. 1981
Juergen Eichler, Rudolf Eidenschink, Guenther Haas, Joachim Krause, Ludwig Pohl, Michael Roemer, and Georg Weber Bonn Bundesministerium fuer Forschung und Technologie Mar. 1983 40 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-004; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 8,50

Single components with the trans-1, 4-linked cyclohexane ring as structural element were synthesized. Compounds which are halogen substituted in their aromatic part were created. Mixtures were designed for twisted nematic cell (direct drive, multiplex drive, broad temperature range) dynamic scattering, and guest-host-effect applications. Physical properties of 23 mixtures are described. Author (ESA)

N83-30287# Standard Elektrik Lorenz A.G., Stuttgart (West Germany). Fachbereich Werkstoffe und Bauelemente.
FERROELECTRIC THIN FILMS FOR IMAGING AND SIGNALING TECHNIQUES Final Report, Mar. 1982
Reimund Dorn, Anca Gutu-Nelle, Hermann Schichl, Johann Springer, and Hans Volz Bonn Bundesministerium fuer Forschung und Technologie Mar. 1983 96 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-015; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 20

Improvement of lanthanum doped lead zirconate/lead titanate ceramics (PLZT) switching voltage and permittivity properties is described. Niobates with tungsten bronze structure and PLZT thin films were prepared and tested. Using lanthanum doped barium niobate titanate materials, ceramic plates with a transparency of 50% were prepared by a two step sintering process. Permittivity (E) is 600 at 10 kHz, contrast ratio is 1:250 at a switching voltage of 450 V. Due to the lower E value compared to PLZT, this material has lower switching time. By RF-sputtering, PLZT thin films (thickness = 4 to 8 microns) with controlled chemical composition, perovskite structure, and a grain size of 1.5 micron diameter were prepared. Saturation polarization of 60 micro C/sqcm is three times higher than that of bulk material PLZT 8.5/68/32. Permittivity is 650. An electro-optic effect was demonstrated. Author (ESA)

N83-30288# Siemens A.G., Munich (West Germany). Zentrale Forschung und Entwicklung.
METHODS OF SUBMICRON ANALYSIS AS ASSISTANCE FOR SEMICONDUCTOR TECHNOLOGY Final Report, Apr. 1982
Hans Rehme, Helmut Oppolzer, and Helmut Schink Bonn Bundesministerium fuer Forschung und Technologie Apr. 1983 44 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-032; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 9,50

Transmission electron microscopy (TEM) was used for the characterization of semiconductor components of submicron size. Preparation techniques and analytical methods (e.g., preparation of cross sectional specimens, X-ray submicron analysis) were developed. The methods were applied to problems in semiconductor technology. Electrical measurement results were related to geometrical effects (overlapping of layers, edge profiles) or material properties. Some pn junctions were visualized on the cross sectional specimens by chemical etching. During imaging by

induced current or voltage contrast, disturbing surface effects depending on preparation technique occur. Author (ESA)

N83-30289# Siemens A.G., Munich (West Germany). Unternehmensbereich Bauelemente.
DISPLAY SUBSYSTEMS WITH LIQUID CRYSTALS Final Report, May 1981
Karl-Heinz Walter, Franz Kahm, and Hans H. Krueger Bonn Bundesministerium fuer Forschung und Technologie Apr. 1983 148 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-047; ISSN-0340-7608) Avail: NTIS HC A07/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 31

Highly multiplexable TN-cells were developed. The liquid crystal material selection and the cell technology are described. Text displays with up to 3 lines of 5 x 7 characters and 2 lines with 5 x 9 characters are obtained with high contrast and viewing angle. With smaller angle of visibility up to 32 microlines are multiplexable. For low ambient light level additional illumination systems were developed and the physio-optic interaction with display parameters were worked out. Displays with higher information content, e.g., data screens with 64 or 128 microlines are feasible with 2-frequency addressable TN-cells. A simulated 128 microline display shows good contrast and viewing angle. Waveforms necessary to drive the system and the circuitry are discussed. A series of application possibilities for display subsystems with liquid crystals in combination with transparent sensor overlays are shown. Author (ESA)

N83-30290# Siemens A.G., Munich (West Germany). Unternehmensbereich Bauelemente.
IC-COMPONENTS WITH MONOLITHIC THIN LAYER CAPACITORS Final Report, Dec. 1981
Horst Pachonik, Kurt-Joern Binder Binder, and Carl-Ernst Eilers Bonn Bundesministerium fuer Forschung und Technologie Apr. 1983 98 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-049; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 20,50

An extremely small capacitor which can be integrated in the package or on the chip itself was developed. The need for high density packing on the PC boards and little inductance due to growing frequencies is met. A process and equipment were developed for producing organic multilayer capacitors of the requested quality and with extremely thin dielectric layers. The substrate carrier passes two vacuum chambers, separated by locks. In the first chamber the dielectric layers are deposited by plasma polymerization and in the second chamber the electrode layers are generated by a sputter process. Self healing capacitors with a considerable number of layers and a consistantly high quality were fabricated by this method on plastic substrates as well as on IC-chips. Author (ESA)

N83-30291# Stuttgart Univ. (West Germany). Inst. fuer Physik.
MATERIALS CHARACTERIZATION OF SILICON AND ANALYSIS OF RECOMBINATION PROCESSES AND IMPURITIES Final Report, Apr. 1982
Wolfgang Schmid, Joachim Wagner, and Joerg Weber Bonn Bundesministerium fuer Forschung und Technologie Apr. 1983 63 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-83-06; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 13,50

Photoluminescence techniques developed for the investigation of shallow impurities in silicon were used to investigate deep centers. Experiments were started with transition metals in silicon. Unusual and characteristic emissions were observed in the low temperature photoluminescence spectra. The tendency of transition metals to form complexes with the group-III acceptors is verified. By time resolved spectroscopy, the influence of deep centers on carrier lifetime was studied. Results show that photoluminescence is a powerful technique to investigate deep centers in silicon. Author (ESA)

N83-30292# International Centre for Diffraction Data, Swarthmore, Pa.
STANDARD X-RAY DIFFRACTION POWER PATTERNS. SECTION 19: DATA FOR 51 SUBSTANCES Final Report
Marlene C. Morris, Howard F. McMurdie, Eloise H. Evans, Boris Paretzkin, Harry S. Parker, Nikos P. Pyrros, and Camden R. Hubbard (NBS) Dec. 1982 122 p
(PB83-164962; NBS-MONO-25-SECT-19; LC-53-61386) Avail: NTIS HC A06/MF A01 CSCL 20B

Standard X-ray powder diffraction patterns are presented for 51 substances. These patterns, useful for identification, were obtained by manual or automated diffractometer methods or were calculated from published crystal structure data. The lattice constants from the experimental work were refined by least squares methods, and reflections were assigned Miller indices consistent with space group extinctions. Relative intensities, calculated densities, literature references, and other relevant data are included. GRA

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

N83-30293# South Carolina Univ., Columbia. Coll. of Engineering.
THERMODYNAMIC CONSISTENCY TEST PROCEDURE USING ORTHOGONAL COLLOCATION AND THE PENG-ROBINSON EQUATION OF STATE
Luther L. Hamm and Vincent VanBrunt Aug. 1982 262 p refs (Contracts W-7405-eng-26; DE-AS05-79SR-1012; EY-77-S-09-1012)
(DE83-007168; ORNL/SUB-81-1012/1) Avail: NTIS HC A12/MF A01

The Christiansen and Fredenslund programs for calculating vapor-liquid equilibria have been modified by replacing the Soave-Redlich-Kwong equation of state with the newly developed Peng-Robinson equation of state. This modification was shown to be a decided improvement for high pressure systems, especially in the critical and upper retrograde regions. Thermodynamic consistency tests were developed and used to evaluate and compare calculated values from both the modified and unmodified programs with reported experimental data for several vapor-liquid systems. DOE

N83-30294# Brookhaven National Lab., Upton, N. Y. Physics Dept.
HIGGS MASS SCALES AND MATTER-ANTI-MATTER OSCILLATIONS IN GRAND UNIFIED THEORIES
Goran Senjanovic 1982 24 p refs Presented at the Neutron-Antineutron Oscillation Workshop, Cambridge, Mass., 30 Apr. 1982
(Contract DE-AC02-76CH-00016)
(DE82-017638; BNL-31423; CONF-820470-2) Avail: NTIS HC A02/MF A01

A general discussion of mass scales in grand unified theories is presented, with special emphasis on Higgs scalars which mediate neutron-antineutron (n-anti n) and hydrogen-antihydrogen (H-anti H) oscillations. The analogue of survival hypothesis for fermions naturally makes such particles superheavy, thus leading to unobservable lifetimes. If this hypothesis is relaxed, an interesting possibility of potentially observable n-anti n and H-anti H transitions, mutually related arises in the context of SU(5) theory with spontaneously broken B-L symmetry. DOE

N83-30295# Fermi National Accelerator Lab., Batavia, Ill.
POLARIZED E + - POLARIZED P COLLIDING BEAMS: PHYSICS ISSUES
J. D. Bjorken Sep. 1982 13 p refs Presented at the 5th Intern. Symp. on High Energy Spin Phys., Upton, N.Y., 16 Sep. 1982
(Contract DE-AC02-76CH-03000)
(DE83-006645; FERMILAB-CONF-82-65-THY; CONF-820941-12) Avail: NTIS HC A02/MF A01

The physics of collisions of polarized electrons with polarized protons at storage ring energies is examined, with emphasis on polarization asymmetries of structure functions. The usefulness of positron proton as well as electron proton collisions is underlined. DOE

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

N83-30296# Office of Technology Assessment, Washington, D.C.
INFORMATIONAL TECHNOLOGY AND ITS IMPACT ON AMERICAN EDUCATION
Nov. 1982 277 p refs
(PB83-174664; OTA-CIT-187; LC-82-600608) Avail: NTIS HC A13/MF A01 CSCL 05I

This report provides an overview of the issues relating to the educational aplications of the new information technologies. It examines both the demands that the information revolution will make on education and the opportunities afforded by the new information technologies to meet those demands. Rather than focusing on a single technology, it examines a wide variety of new information products and services such as those based on the combined capabilities of computers, telecommunications systems, and video technologies. Similarly, the report surveys a broad range of educational providers, and examines how the application of information technologies may effect their abilities to provide education and their respective educational roles. Author

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N83-30297*# United Technologies Corp., South Windsor, Conn. Power Systems Div.
TASK 4 COMPLETION REPORT FOR 40 KILOWATT GRID CONNECTED MODIFICATION CONTRACT Final Report
Joseph H. Vogt Jun. 1983 40 p
(Contracts DEN3-210; DE-AI21-80ET-17088)
(NASA-CR-167950; DOE/NASA/0219-1; NAS 1.26:167950; FCR-4294) Avail: NTIS HC A03/MF A01 CSCL 05A

Startup, operation in grid connect mode, shutdown from grid connects, operation in isolated mode, shutdown from isolated mode, steady state operation, mode transfers, and voltage disconnects are addressed. Author

N83-30298# Lincoln Lab., Mass. Inst. of Tech., Lexington.
MODELING AND ANALYSIS OF TEAMS OF INTERACTING DECISIONMAKERS WITH BOUNDED RATIONALITY
Kevin I. Beottcher and Alexander H. Levis Oct. 1982 26 p refs Presented at the IFAC/IFIP/IFORS/IEA Conf. on Analysis, Design, and Evaluation of Man-Machine Systems, Baden-Baden, West Germany
(Grant AF-AFOSR-0029-80; AF Proj. 2304)
(AD-A125582; LIDS-P-1252; AFOSR-83-0073TR) Avail: NTIS HC A03/MF A01 CSCL 05/1

A methodology for analyzing and evaluating alternative organizational structures is presented. An information theoretic framework is used in which each team member is described by a two-stage model consisting of situation assessment and response selection stages as well as interconnections with the rest of the organization. The information processing and decision making load of each team member and the measure of organizational performance are depicted in the performance-workload space as implicit functions of the decision strategies of each individual member. The approach to evaluating organizational structures is illustrated through the detailed analysis of an organization consisting of two decision-makers with bounded rationality. GRA

N83-30299# Planning Systems, Inc. Slidell, La.
ADVANCED TYPE PLACEMENT AND GEONAMES DATABASES: COMPREHENSIVE COORDINATION PLAN Final Report
Allen E. Barnes, Ed C. Gough, Robert M. Brown, and Al Zied Jan. 1983 147 p refs
(Contract N00014-82-C-0726)
(AD-A126241; NORDA-TN-189) Avail: NTIS HC A07/MF A01 CSCL 05/2

This paper presents a preliminary comprehensive coordination plan for the technical development and integration of an automated names database capture and management of an overall automated cartographic system, for the Defense Mapping Agency. It broadly covers the technical issues associated with system and associated subsystems functional requirements, inter-subsystem interaction common technologies in hardware, software, database, and artificial intelligence. The 3-phase R&D cycles for each and all subsystems are also outlined. Author (GRA)

N83-30300# Naval Postgraduate School, Monterey, Calif. Dept. of Administrative Sciences.
THE NAVAL DATA AUTOMATION COMMAND: A CASE STUDY M.S. Thesis
Nancy A. Lambert Dec. 1982 76 p refs
(AD-A126290) Avail: NTIS HC A05/MF A01 CSCL 05/1

The paper contains an examination of the Naval Data Automation Command (NAVDAC) and the ramifications of the lack of long range planning upon NAVDAC. Four perspectives are taken, examining the effect upon NAVDAC's creation, mission, structure and control systems. The position held by the author is that because no long range plan existed the Navy: (1) Created an ADP command designed to correct the problems of the past rather than implement future requirements; (2) A discrepancy arose between NAVDAC's domain and its mission resulting in the pursuance of a modified mission; (3) The centralized functional organization of NAVDAC reflects this mission; and (4) No defined control systems exist against which to objectively evaluate NAVDAC. Author (GRA)

N83-30301# Deputy Chief of Staff for Research Development and Acquisition (Air Force), Washington, D.C.
DEPARTMENT OF THE AIR FORCE SUPPORTING DATA FOR FISCAL YEAR 1984 BUDGET ESTIMATES SUBMITTED TO CONGRESS, JANUARY 31, 1983. DESCRIPTIVE SUMMARIES, RESEARCH, DEVELOPMENT, TEST AND EVALUATION Final Report, 1 Oct. 1983 - 30 Sep. 1984
B. T. Bentley Jan. 1983 995 p
(AD-A125932; RDXJ-RD-84-1) Avail: NTIS HC A99/MF A01 CSCL 05/1

This document has been prepared to provide information on the United States Air Force (USAF) Research, Development, Test and Evaluation (RDT/E) Program to Congressional Committees during the Fiscal Year 1984 hearings. This information is in addition to the testimony given by DOD witnesses. A Descriptive Summary is provided for each program element within the USAF FY 1984 RDT/E Program. A Test and Evaluation section is provided for major weapon systems. The formats and contents of this document are in accordance with the guidelines and requirements of the Congressional Committees insofar as possible. The 'RESOURCES' portion of the Descriptive Summaries includes, in addition to RDT/E funds, procurement funds and quantities, Military Construction Appropriation funds on specific development programs, Operation and Maintenance Appropriation funds where they are essential to the development effort described, and where appropriate, Department of Energy (DOE) costs. The last section of the Fiscal Year 1984 Descriptive Summaries, entitled 'Facilities

Exhibits,' contains information on major improvements to and construction of government owned facilities funded by RDT/E. GRA

N83-30302# Davidson (Harold F.), Fairfax, Va.
DEPARTMENT OF DEFENSE IN-HOUSE RDT AND E (RESEARCH DEVELOPMENT TEST AND EVALUATION) ACTIVITIES Management Analysis Report
Harold F. Davidson 30 Oct. 1981 160 p
(Contract DAAK21-82-C-0097)
(AD-A125498) Avail: NTIS HC A08/MF A01 CSCL 05/1

This report was prepared for the US Army Materiel Development and Readiness Command at the direction of the deputy chief of staff for research, development, and acquisition. This edition is the fifteenth of a series that was initiated in 1966. Each In-House RDTE activity of the Department of Defense is described on one page in this compilation. The data for 1981 are summarized in tables preceding the main text and charts and tables are provided for each service showing organizational relationships and command chain. All current DOD RDTE activities which meet the report requirement of having at least 25 per cent of their budget in RDTE funds are listed in the contents alphabetically within each department. Some T&E facilities which do not meet the requirement previously noted are also listed by special request. Organizational changes during FY 1981 appear in Appendix 1. GRA

N83-30303# Office of Technology Assessment, Washington, D.C. Space, Transportation, and Innovation Program.
SPACE SCIENCE RESEARCH IN THE US: A TECHNICAL MEMORANDUM
Sep. 1982 53 p
(PB83-166512; OTA-TM-STI-19; LC-82-600633) Avail: NTIS HC A04/MF A01 CSCL 05A

Selective budget cuts and reallocation of funds within the National Aeronautics and Space Administration's space science program have left planetary science, solar and heliospheric physics, gamma ray astronomy, and X-ray astronomy with uncertain futures. Many in the space science community think that the program has lost its sense of direction and that it is time for national goals for space science to be articulated. The views of many people interested in space science including those of representatives of several Federal agencies, space scientists, and staff members of congressional committees and individual Congressmen are summarized. GRA

N83-30304# Decision Science Consortium, Inc., Falls Church, Va. Technology Assessment and Risk Analysis.
TOWARDS A PRESCRIPTIVE ORGANIZATION THEORY OF DECISION AIDING FOR RISK MANAGEMENT. PHASE 1: CONCEPTUAL DEVELOPMENT
Rex V. Brown Nov. 1982 60 p refs
(Grant NSF PRA-82-12159)
(PB83-156109; NSF/PRA-83044) Avail: NTIS HC A04/MF A01 CSCL 05J

The analytical and empirical problems of prescribing actions in organizations, particularly actions designed to aid decision making are addressed. Other ways to enhance organizational decisions, such as manipulating reward and authority systems, are considered. The need for organizational prescription is emphasized, and attempts at generating specific organizational prescriptions are noted. Distinctions between internal and external action are examined and a conceptual model is proposed to analyze the probable consequence of internal actions. Ideas for further research are suggested. An example of how prescription organization ideas might apply in the design of combat control systems used by the commanding officer of an attack submarine is provided. GRA

N83-30305# National Bureau of Standards, Washington, D.C.
JOURNAL OF RESEARCH OF THE NATIONAL BUREAU OF STANDARDS, VOLUME 87, NUMBER 5, SEPTEMBER - OCTOBER 1982
1982 110 p
(PB83-164541; LC-63-37059) Avail: NTIS HC A06/MF A01 CSCL 05A

Contents: Consensus values and weighting factors; Report on the Sixth International Symposium on Temperature; Nondestructive evaluation methods for quality acceptance of installed building materials; Publications of the National Bureau of Standards. GRA

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software.*

N83-30306*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SCIENTIFIC AND TECHNICAL INFORMATION OUTPUT OF THE LANGLEY RESEARCH CENTER FOR CALENDAR YEAR 1982 Annual Report
Jun. 1983 215 p
(NASA-TM-84615; NAS 1.15:84615) Avail: NTIS HC A10/MF A01 CSCL 05B

Citations are presented for 1380 for formal reports; quick-release technical memorandum; contractor reports; journal articles and periodical literature; technical talks and meeting presentations; computer programs; tech briefs, and patents produced during 1982. An author index is provided. A.R.H.

N83-30307# Damans and Associates, Inc., Gaithersburg, Md.
INTEGRATION OF NEW TECHNOLOGY IN ARMY LIBRARIES Final Report, 27 Oct. 1981 - 2 Jul. 1982
Janine Reid, Paula Strain, Arthur Linsley, Jose-Marie Griffiths, and Vernon E. Palmour 2 Jul. 1982 150 p refs Prepared in cooperation with King Research, Inc., Rockville, Md.
(Contract MDA903-81-C-0591)
(AD-A125983) Avail: NTIS HC A07/MF A01 CSCL 05/2

The 1976 Study of US Army Libraries recommended that the technical processing functions of each Army library be consolidated or centralized at the installation level. 'Integration of New Technology in Army Libraries' determined the feasibility of installation-level networking of technical processing activities, and develops the means through which new technology can be integrated into Army libraries. Site visits to Fort Belvoir, Virginia and Aberdeen Proving Ground, Maryland, libraries gathered information that detailed current library technical processing operations for monographs, serials, and technical reports. Library automated turnkey systems and alternative configurations for consolidation were examined. Based on gathered data, a cost model was developed and applied to decentralized, installation-level, and command-level technical processing. Recommendations include projected organizational, staffing, and budget requirements, and an implementation plan for installation-level consolidation. Author (GRA)

N83-30308# Damans and Associates, Inc., Gaithersburg, Md.
INTEGRATION OF NEW TECHNOLOGY IN ARMY LIBRARIES, APPENDICES Final Report, 27 Oct. 1981 - 2 Jul. 1982
Janine Reid, Paula Strain, Arthur Linsley, Jose-Marie Griffiths, and Vernon Palmour 2 Jul. 1982 197 p
(Contract MDA903-81-C-0591)
(AD-A125984) Avail: NTIS HC A09/MF A01 CSCL 05/2

The 1976 Study of US Army Libraries recommended that the technical processing functions of each Army library be consolidated or centralized at the installation level. Integration of New Technology in Army Libraries determined the feasibility of installation-level networking of technical processing activities, and develops the means through which new technology can be integrated into Army Libraries. Site visits to Fort Belvoir, Virginia and Aberdeen Proving Ground, Maryland, libraries gathered information that detailed current library technical processing operations for monographs, serials, and technical reports. Library automated turnkey systems

and alternative configurations for consolidation were examined. Based on gathered data, a cost model was developed and applied to decentralized, installation-level, and command-level technical processing. Recommendations include projected organizational, staffing, and budget requirements, and an implementation plan for installation-level consolidation. Author (GRA)

N83-30309# Naval Health Research Center, San Diego, Calif.
THE NAVY MENTAL HEALTH INFORMATION SYSTEM (NAMHIS): AN OVERVIEW Interim Report
R. Blake Chaffee, Gregory D. Baker, and Douglas Kolb Feb. 1983 27 p refs
(AD-A126087; NAVHLTHRSCHC-83-2) Avail: NTIS HC A03/MF A01 CSCL 05/2

A standardized mental health recordkeeping system has been developed by the Naval Health Research Center to serve as a basis for a comprehensive, automated Navy Mental Health Information System (NAMHIS). The system is designed to collect and store information obtained in direct patient contacts to generate consultation reports and to perform administrative functions. An individual patient record is initiated when an individual first comes to an outpatient mental health clinic, and an Administrative/Encounter Form is completed. It contains basic demographic data and information about who referred the patient, reasons for referral, services provided, and disposition as well as clinician and clinic identifications. Each time an individual returns to the clinic a Follow-Up/Encounter Form is completed to record the service provided and the disposition. All data are entered into the computer via a terminal located in the clinic. From these data the following reports can be generated: Report of Consultation, Monthly Managerial Report, Monthly Quality Assurance Report, and Monthly Outpatient Morbidity Report. Initially, the system will be implemented on a fully automated basis is one clinic in the San Diego region. Future plans call for regionwide implementation and ultimately recommendations concerning Navywide implementation. GRA

N83-30310# Stanford Univ., Calif. Dept. of Computer Science.
THE 3 PAPERS ON RULE-BASED ESTIMATION OF STATISTICS ON DATABASES
Neil C. Rowe Oct. 1982 39 p
(Contract N00039-82-G-0250)
(AD-A126198; SU-STAN-CS-82-948) Avail: NTIS HC A03/MF A01 CSCL 05/2

This report contains three papers on rule-based estimation of statistics on a database: an overview, followed by two more specialized papers. The first, Rule-based Statistical Calculations on a Database Abstract, is addressed to a general database audience. The second, Inheritance of Statistical Properties, is addressed to an artificial intelligence audience, the third, Diophantine Compromise of a Statistical Database, is addressed to an audience of database theorists. GRA

N83-30311# Energy Information Administration, Washington, D.C.
EIA DATA INDEX: AN ABSTRACT JOURNAL. THIRD SUPPLEMENT, JUL.-DEC. 1981
Jun. 1982 554 p
(DE83-006533; DOE/EIA-0233(81/2)) Avail: NTIS HC A24/MF A01

The Data Index includes a complete subject index, and a report number listing for all Energy Information Administration (EIA) publications as well as complete information on how to order these publications. The abstracts of the tables and graphs are arranged by broad subject categories such as coal and coal products, petroleum, natural gas, and energy analysis and modeling. These subject categories are further divided into sub-categories. Each abstract displays the following information: the report number, the page within the report on which the item can be found, the title of the table or graph, the data date, and the data source. Further, the abstract describes what data are displayed in the table or graph and how those data are aggregated. The Data Index is a companion volume to the EIA Publications Directory: A User's Guide, which provides subject access to all of the EIA publications at the document level. Together, these two directories serve as a complete abstracting and indexing service for the microfiche and hard copy publications of the Energy Information Administration. DOE

N83-30312# California Univ., Livermore. Lawrence Livermore Lab.
MANAGEMENT OF REFERENCE INFORMATION SERVICES: A DYNAMIC RESOURCE ALLOCATION AND SIMULATION MODEL Ph.D. Thesis
Dennis Raymond Elchesen May 1982 434 p refs
(Contract W-7405-eng-48)
(DE82-019879; UCRL-53261) Avail: NTIS HC A19/MF A01

A comprehensive tool is presented to aid in the cost-effective management of library reference services. The tool consists of a dynamic resource allocation model and an associated computer simulation program. The model and the computer program are known collectively as REFSIM. Three types of library reference services are addressed in REFSIM: (1) answering ready reference, or quick lookup types of queries; (2) conducting in-depth, retrospective literature searches; and (3) providing current awareness notifications, or selective dissemination of information (SDI) services. Both manual and computer-based approaches to the provision of these services are considered. The REFSIM model simulates the provision and management of these services. It contains components to represent the human, information, and equipment resources required to provide these services; components to represent requester demand, the performance being exhibited by each service; and the degree of satisfaction being experienced by the requesters. Author

N83-30313# California Univ., Livermore. Lawrence Livermore Lab.
SUMMARY OF RULES FOR SAMPLING, DECIMATION, AND INTERPOLATION OF EXPERIMENTAL DATA
G. A. Clark and E. J. Bogdan Apr. 1982 47 p refs Sponsored in part by Naval Ocean Systems Center
(Contract W-7405-eng-48)
(DE82-016360; UCID-19411) Avail: NTIS HC A03/MF A01

This laboratory reference contains a condensed set of rules for sampling, decimating and interpolating experimental data. Emphasis is placed upon the fact that limitations of measurement equipment can restrict the ability to sample continuous time signals. Those limitations are discussed, along with examples of decimation and interpolation of some actual data from the transient electromagnetic range. DOE

N83-30314# Projektgruppe Informationssysteme G.m.b.H., Berlin (West Germany).
CLASSIFICATION SYSTEMS IN INFORMATION AND DOCUMENTATION. POSSIBILITIES OF FURTHER DEVELOPMENT Final Report, Aug. 1982
Margarete Burkart-Sabsoub Bonn Bundesministerium fuer Forschung und Technologie Apr. 1983 103 p refs In GERMAN; ENGLISH summary
(BMFT-FB-ID-83-003; ISSN-0170-8996) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 21,50

Over 380 classification systems were recorded and analytically described and a graphical synopsis was derived. Questionnaire surveys of 306 users of documentary languages, and of 183 persons concerning the use of the Universal Decimal Classification were completed. The dimensions of decisions for classification systems were investigated. The combinatorial use of classification systems and other documentary languages was systematized. Technological and methodological developments (interactive videotext, fact retrieval, full text systems, artificial intelligence, universalism) were studied according to their implications for classification practice and research. The results show that the classical area of information and documentation is well developed methodologically, but there is a lack of application knowledge and in some areas no authoritative classifications exist. Author (ESA)

N83-30315# Pacific Southwest Forest and Range Experiment Station, Berkeley, Calif.
FORESTRY INFORMATION SYSTEMS AND TERMINOLOGY
Theodor B. Yerke, ed. Oct. 1982 169 p refs Proceedings of the 17th World Congr. of the Intern. Union of Forestry Res. Organ., Kyoto, 6-17 Sep. 1981
(PB83-156158) Avail: NTIS HC A08/MF A01 CSCL 05B

More than 1200 participants of forestry and forest products research institutes from all over the world examined the state of penetration of information science and techniques into forestry research. Subjects ranging from structure of and online access to machine-readable databases and in-house information systems to the present state and further development of the Multilingual Forestry Terminology project were discussed. GRA

N83-30316# Tulsa Univ., Okla. Dept. of Chemical Engineering.
ENVIRONMENTAL ASSESSMENT DATA BASE FOR PETROLEUM REFINING WASTEWATERS AND RESIDUALS Final Report, Jun. 1978 - Jun. 1981
Francis S. Manning and Eric M. Snider Feb. 1983 242 p refs (Contract EPA-R-805099)
(PB83-164749; EPA-600/2-83-010) Avail: NTIS HC A11/MF A01 CSCL 05B

A Peer-Group Review Committee was established to provide direction to the project and to ensure that a diversity of viewpoints was considered. Four comprehensive state-of-the-art reviews, by outside consultants were prepared. The four individual state-of-the-art reviews were critically examined and eight areas where further research was considered necessary to improve the data base were selected. GRA

N83-30317# National Library of Medicine, Bethesda, Md.
NOTES FOR MEDICAL CATALOGERS, 1982
Mar. 1983 138 p
(PB83-170860; NLM-TSD-83-01) Avail: NTIS HC A07/MF A01 CSCL 05B

Articles and news announcements describing the cataloging policies, procedures, and bibliographic databases of the Cataloging Section of the National Library of Medicine are presented. GRA

N83-30318# Office of Technology Assessment, Washington, D.C.
MEDLARS AND HEALTH INFORMATION POLICY
Sep. 1982 150 p refs
(PB83-168658; OTA-TM-H-11; LC-82-600639) Avail: NTIS HC A07/MF A01 CSCL 05B

The National Library of Medicine's (NLM) role in the creation and distribution of computerized health related bibliographic information in light of the private sector's presence in this field and the public interest was examined. MEDLARS (Medical Literature Analysis and Retrieval System) and its effectiveness in disseminating bibliographic health related information is discussed. GRA

N83-30319# National Science Foundation, Washington, D.C. Office of Planning and Resources Management.
STUDIES OF SCIENTIFIC DISCIPLINES: AN ANNOTATED BIBLIOGRAPHY
1982 178 p
(PB83-159954; NSF/PRM-82006; NSF-83-7) Avail: NTIS HC A09/MF A01 CSCL 05B

The bibliography lists studies of thirteen disciplinary areas: astronomy, general biology, biochemistry and molecular biology, biomedicine, chemistry, Earth and space sciences, economics, engineering, mathematics, physics, political science, psychology, and sociology. These studies are cross-linked by twenty-three topics of social and organizational interest. Appendix 1 presents a matrix which classifies the distribution of annotations by discipline and topic, highlighting areas of coverage and suggesting areas that require further study. General reference works concerned with the scope and nature of the social study of science are included. GRA

N83-30320# National Academy of Sciences - National Research Council, Washington, D. C.
SCIENTIFIC COMMUNICATION AND NATIONAL SECURITY Technology Transfer Review, Mar. - Sep. 1982
1982 204 p refs Sponsored in part by the American Association for the Advancement of Science and the American Chemical Society
(Contract MDA903-82-C-0471; Grant NSF INT-83-1191)
(PB83-157800; ISBN-0-309-03332-2; LC-82-62183) Avail: NTIS HC A10/MF A01 CSCL 05A

This report is a review of national security policies and controls. The review was conducted by a panel of the National Academy of Sciences (NAS), National Academy of Engineering (NAE) and Institute of Medicine (IOM) and covers the period March 1982 - September 1982. The principal task of the panel was to examine the relation between scientific communication and national security in light of the growing concern that foreign nations are gaining military advantage from such research. The panel developed recommendations on appropriate mechanisms for preventing unwanted technology losses from university research, on adjustments that should be made in the current system for licensing technology exports from all U.S. sources, on the advisability and limits of voluntary self-restraint on the part of the reseacher, and on further information needs to improve future government policy on export controls. GRA

N83-30321# Old Dominion Systems, Inc., Gaithersburg, Md.
DISTRIBUTED INFORMATION DELIVERY SYSTEM. DESIGN MANUAL, VERSION 1.0
Jeffrey Fischer and Dennis Benson Nov. 1982 191 p Sponsored by the Lister Hill National Center for Biomedical Communications
(PB83-148809; LHNCBC-TR-82-28) Avail: NTIS HC A09/MF A01 CSCL 06E

The Lister Hill National Center for Biomedical Communications (LHNCBC) has developed a prototype, microprocessor-based, stand-alone information delivery system in order to evaluate the feasibility of using a microcomputer system for retrieval from full-text encyclopedia databases. This experimental system has been programmed in PASCAL and is restricted to database delivery. The Design Manual is one of five system manuals and provides an integrated, detailed description of all the delivery system software. The manual relates the system functions to specific software components, defines all the data elements, and describes the linkages between components in the first section, System Functions, an overview is presented of the logical relationships and data flow of the major subsystems. Author (GRA)

N83-30322# Old Dominion Systems, Inc., Gaithersburg, Md.
DISTRIBUTED INFORMATION DELIVERY SYSTEM MODULE DESCRIPTIONS, VERSION 1.0
Jeffrey Fischer and Dennis Benson Nov. 1982 92 p Sponsored by the Lister Hill National Center for Biomedical Communications
(PB83-156703; LHNCBC-TR-82-29) Avail: NTIS HC A05/MF A01 CSCL 06E

The Lister Hill National Center for Biomedical Communications (LHNCBC) has developed a prototype, microprocessor-based, stand-alone information delivery system in order to evaluate the feasibility of using a microcomputer system for retrieval from full-text encyclopedic databases. This experimental system has been programmed in PASCAL and is restricted to database delivery. The Module Descriptions manual is one of five system manuals and contains functional descriptions of each logically discrete section of PASCAL code within the delivery system. A logical module is considered to be any functionally discrete procedure, function, or group of procedures or functions. The manual describes each logical module according to a standard format. Author

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

No abstracts in this category.

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

N83-30323# Committee on Science and Technology (U. S. House).
ENGINEERING AND SCIENCE MANPOWER ACT OF 1982
Washington GPO 1982 240 p refs Hearings on H.R. 5254 before the Subcomm. on Sci., Res. and Technol. of the Comm. on Sci. and Technol., 97th Congr., 2d Sess., no. 107, 27, 29 Apr. 1982
(GPO-96-196) Avail: Subcommittee on Science, Research and Technology

A national policy which will ensure an adequate supply of scientists and engineers necessary to meet the needs of our country in the future is addressed. Author

N83-30324# Committee on Commerce, Science, and Transportation (U. S. Senate).
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION ACT, 1983
Washington GPO 1983 25 p An act, H.R. 2065, referred to the Comm. on Com., Sci. and Transportation, 97th Congr., 1st Sess., 27 Jun. 1983
Avail: US Capitol, Senate Document Room

Appropriations to the National Aeronautics and Space Administration for research and development, construction of facilities, and research and program management, and for other purposes are authorized. Author

N83-29290# Joint Publications Research Service, Arlington, Va.
LEGAL DELIMITATION OF AIRSPACE
A. Terekhov *In its* USSR Rept.: Space, No. 22 (JPRS-83612) 6 Jun. 1983 p 85-87 Transl. into ENGLISH from Aviatsiya i Kosmonavtika (Moscow), no. 1, Jan. 1983 p 46-47 (For primary document see N83-29280 18-12)
Avail: NTIS HC A06

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

N83-30325*# Operations Research, Inc., Silver Spring, Md.
EMERGENCY MEDICAL SERVICE (EMS): ROTORCRAFT TECHNOLOGY WORKSHOP
James Bauchspies and Richard Adams Oct. 1981 39 p Workshop held at NASA. Ames Research Center, Moffett Field, Calif., Jul. 1980 Prepared in cooperation with Systems Control Technology, Inc., West Palm Beach, Fla.
(Contract NAS2-10411)
(NASA-CR-166495; NAS 1.26:166495) Avail: NTIS HC A03/MF A01 CSCL 05A

A lead organization on the national level should be designated to establish concepts, locations, and the number of shock trauma air medical services. Medical specialists desire a vehicle which incorporates advances in medical technology trends in health care. Key technology needs for the emergency medical services helicopter of the future include the riding quality of fixed wing aircraft (reduced noise and vibration), no tail rotor, small rotor, small rotor diameter, improved visibility, crashworthy vehicle, IFR capability, more affordability high reliability, fuel efficient, and specialized cabins to hold medical/diagnostic and communications equipment. Approaches to a national emergency medical service are discussed. A.R.H.

N83-30326*# Stanford Univ., Calif. Dept. of Engineering-Economic Systems.
RESEARCH IN SPACE COMMERCIALIZATION, TECHNOLOGY TRANSFER AND COMMUNICATIONS Final Report, 1 Jul. 1978 - 30 Jun. 1983
Donald A. Dunn and Carson E. Agnew 1983 468 p refs 2 Vol.
(Contract NASw-3204)
(NASA-CR-172886; NAS 1.26:172886) Avail: NTIS HC A20/MF A01 CSCL 05B

Public sector R and D evaluation, NASA technology transfer, market-oriented approaches to national science policy, and markets with implications for technology transfer are discussed. Author

N83-30327*# Stanford Univ., Calif. Dept. of Engineering-Economic Systems.
RESEARCH IN SPACE COMMERCIALIZATION, TECHNOLOGY TRANSFER AND COMMUNICATIONS Final Report, 1 Jul. 1978 - 30 Jun. 1983
Donald A. Dunn and Carson E. Agnew 1983 635 p refs 2 Vol.
(Contract NASw-3204)
(NASA-CR-172887; NAS 1.26:172887) Avail: NTIS HC A99/MF A01 CSCL 05B

Spectrum management, models for evaluating communications systems, and implications of communications regulations for NASA are considered as major parts of communications policy. Marketing LANDSAT products in developing countries, a political systems analysis of LANDSAT, and private financing and operation of the space operations center (space station) are discussed. Investment requirements, risks, government support, and other primary business and management considerations are examined. A.R.H.

N83-30328*# Martini Engineering, Richland, Wash.
STIRLING ENGINE DESIGN MANUAL, 2ND EDITION
William R. Martini Jan. 1983 412 p refs
(Grant NsG-3194; Contract DE-AI01-77CS-51040)
(NASA-CR-158088; DOE/NASA/3194-1; NAS 1.26:158088) Avail: NTIS HC A18/MF A01 CSCL 13F

This manual is intended to serve as an introduction to Stirling cycle heat engines, as a key to the available literature on Stirling engines and to identify nonproprietary Stirling engine design methodologies. Two different fully described Stirling engines are discussed. Engine design methods are categorized as first order, second order, and third order with increased order number indicating increased complexity. FORTRAN programs are listed for both an isothermal second order design program and an adiabatic second order design program. Third order methods are explained and enumerated. In this second edition of the manual the references are updated. A revised personal and corporate author index is given and an expanded directory lists over 80 individuals and companies active in Stirling engines. Author

N83-30329# Transportation Systems Center, Cambridge, Mass.
NOISE TEST-RESILIENT WHEELS MASSACHUSETTS BAY TRANSPORTATION AUTHORITY GREEN LINE Final Report, Feb. - Apr. 1982
E. J. Rickley and M. J. Brien Washington Urban Mass Transportation Administration Nov. 1982 80 p
(PB83-148635; DOT-TSC-UMTA-82-16; UMTA-MA-06-0099-82-4)
Avail: NTIS HC A05/MF A01 CSCL 13F

The results of noise and ground borne vibration measurements made for three rail transit vehicles operating on the Green Line of the Massachusetts Bay Transportation Authority (MBTA) are presented. The noise and vibration performance of Sab-V resilient wheels as compared to Acoustaflex (resilient) and solid-steel wheels, both in current use on the Green Line of the MBTA were assessed. Two Boeing Light Rail Vehicles (LRV) and one Presidential Conference Committee Car (PCC) were each equipped with a different wheel set: Sab-V, Acoustaflex, and solid-steel, respectively. Noise was measured inside the vehicles in the passenger seating areas and at wayside locations where ground-borne vibration was also measured. The data include comparative noise and vibration time histories, one third octave and narrow band spectral analysis, and in car statistical noise data. GRA

N83-29289# Joint Publications Research Service, Arlington, Va.
CONTRIBUTION OF SPACE PROGRAM TO NATIONAL ECONOMY
In its USSR Rept.: Space, No. 22 (JPRS-83612) 6 Jun. 1983 p 78-84 Transl. into ENGLISH from Ekonomich. Gazeta (Moscow), no. 12, Mar. 1983 p 2 (For primary document see N83-29280 18-12)
Avail: NTIS HC A06

88 SPACE SCIENCES (GENERAL)

No abstracts in this category.

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N83-30330# Defense Mapping Agency Hydrographic and Topographic Center, Washington, D.C.
CATALOGUE OF 20457 STAR POSITIONS OBTAINED BY PHOTOGRAPHY IN THE DECLINATION ZONE -48 DEG TO -54 DEG (1950)
Heinrich Eichhorn (Florida Univ.), William D. Googe, Carl F. Lukac, and J. Kenneth Murphy 1983 33 p refs Submitted for publication
(AD-A126161) Avail: NTIS HC A03/MF A01 CSCL 03/2

The methods for constructing a catalogue of 20457 star positions for the epoch 1964 between -48 deg to -54 deg declination are described. The positions were obtained by the overlap method, and images generated by a coarse diffraction grating were employed to control magnitude related effects on the positions. A selection of about two faint ac stars per square degree was included to serve as material for the eventual determination of magnitude effects on the ac positions. The standard error of catalogued position estimate based on two images is 0.12 sec in either coordinate. GRA

N83-30331# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo.
SOLAR-GEOPHYSICAL DATA PROMPT REPORTS. PART 1: DATA FOR OCTOBER 1982, SEPTEMBER 1982 AND LATE DATA. EXPLANATION OF DATA REPORTS ISSUED AS NUMBER 450 (SUPPLEMENT) FEBRUARY 1982
Helen E. Coffey, ed. Nov. 1982 167 p 2 Vol.
(PB83-162057; SGD-459-Pt-1) Avail: NTIS HC A08/MF A01 CSCL 03B

Topics covered include the following; Alert periods; Daily solar indices; Solar flares; Solar radio emission; Infrared interplanetary magnetic field polarities; Mean solar magnetic field; Spacecraft observations; Sudden ionospheric disturbances; Cosmic rays, Geomagnetic indices; Radio propagation indices. Author (GRA)

N83-30332# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo.
SOLAR-GEOPHYSICAL DATA COMPREHENSIVE REPORTS. PART 2: DATA FOR MAY 1982, JUNE 1980 AND MISCELLANEA. EXPLANATION OF DATA REPORTS ISSUED AS NUMBER 450 (SUPPLEMENT) FEBRUARY 1982
Helen E. Coffey, ed. Nov. 1982 99 p 2 Vol.
(PB83-162065; SGD-459-Pt-2) Avail: NTIS HC A05/MF A01 CSCL 03B

Topics covered include: solar flares; solar radio emission; solar X-ray radiation; and mass ejections from the Sun. GRA

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N83-30333 Academy of Sciences (USSR), Moscow.
GLOBULAR CLUSTERS AND X-RAY BURSTERS Space Research Inst.
G. S. Bisnovatyi-Kogan and M. M. Romanova 1983 20 p refs (PR-764) Copyright. Avail: Issuing Activity

The question about the origin of the X-ray bursters in the galaxy is analyzed based on the binary stars formation due to the tidal captures and taking into account the dissipation of the globular clusters. It is shown that about one half of the bulge X-ray bursters could be past members of the globular clusters if the living time of the bursters tau approximately 6.66 billion years and the number of the clusters in the past was 0.1 times greater than now. Author

N83-30334 Academy of Sciences (USSR), Moscow. Space Research Inst.
FORMATION OF UNIVERSES IN SPACES OF VARYING DIMENSIONALITY
I. L. Rozental 1983 10 p refs
(PR-775) Copyright. Avail: Issuing Activity

Arguments are given in favor of the multidimensional background space. A model of universe formation with N not = 3+/-1, based on the Kasuer metric. Author

N83-30335 Academy of Sciences (USSR), Moscow. Space Research Inst.
PHENOMENOLOGICAL MODEL OF THE NUCLEUS OF THE GALAXY
N. S. Kardashev 1983 51 p refs
(PR-728) Copyright. Avail: Issuing Activity

The observational data related to the most central part of the Galaxy's nucleus is compared. The assumption is considered that the nucleus of our Galaxy is a binary super massive system; a black hole - compact star cluster or binary black hole actively interacting with stars of the central cluster and responsible for the variety of unusual phenomena observed in the region. Author

N83-30336*# Atmospheric and Environmental Research, Inc., Cambridge, Mass.
IO ESCAPE AND IONIZATION OF ATMOSPHERIC GASES Annual Report, 15 Apr. 1982 - 14 Apr. 1983
William H. Smyth Apr. 1983 40 p refs
(Contract NASw-3503)
(NASA-CR-172885; NAS 1.26:172885; Rept-2) Avail: NTIS HC A03/MF A01 CSCL 03B

Exploratory model calculations for the Io atomic oxygen cloud have provided two-dimensional sky-plane intensities for the 6300 A, 1304 A and 880 A lines, where volume excitation and ionization rates are determined by impact collisions with Io plasma torus electrons. Comparison of model results with observations at 6300 A suggests an isotropic oxygen flux from Io of about 1.5x109 atoms 1 sq cm/sec. The effects of including a neutral sulfur cloud and also of including charge exchange reactions between plasma torus ions and neutral OI and SI were evaluated to be significant and were roughly estimated to increase the required oxygen flux to 1.2 x 10 to the 10th atoms/sq cm/sec. In addition, increases in the estimates for the ion loading, cloud mass loss, plasma mass loading and ion energy input rates were also made. Model calculations for an Io sulfur cloud, excluding charge exchange reactions but assuming an SI flux of 7.5 x 10 to the 8th atoms/sq cm/sec (i.e., half of the oxygen flux), were also performed and provided sky plane intensities for a number of visible and IR emission lines. Author

N83-30337# Science Research Council, Chilton (England).
FIRST THREE YEARS OF IUE (INTERNATIONAL ULTRAVIOLET EXPLORER SATELLITE)
P. M. Gondhalekar, C. Jordan, A. J. Meadows, K. Nandy, and M. V. Penston Nov. 1981 33 p refs

(PB83-166496; RL-81-091) Avail: NTIS HC A03/MF A01 CSCL 03B

The report highlights results obtained from the International Ultraviolet Explorer satellite, a project in which the UK was involved. These include the observation of the UV spectra of nearly all primary bodies in the solar system; of a large sample of quasars, including the detection of faint high redshift objects; and of chromospheric effects over a wide range of late-type stars. New evolutionary theories have been required to explain the high mass loss rates found in the winds of luminous stars. Interaction effects between primary and compact objects were seen in several X-ray binaries. An exhaustive analysis of nova Cyg 1978 supported the theory that the outburst is caused by thermonuclear runway in material accreted onto a white dwarf. Author (GRA)

N83-30338# Science Research Council, Chilton (England).
DETAILED OBSERVATIONS OF NGC 4151 WITH IUE (INTERNATIONAL ULTRAVIOLET EXPLORER). PAPER 2: VARIABILITY OF THE CONTINUUM FROM 1978 FEBRUARY TO 1980 MAY, INCLUDING X-RAY AND OPTICAL OBSERVATIONS Final Report, Feb. 1978 - May 1980
G. C. Perola, A. Boksenberg, G. E. Bromage, J. Clavel, M. Elvis, A. Elvius, P. M. Gondhalekar, J. Lind, C. Lloyd, M. V. Penston et al Feb. 1982 27 p refs
(PB83-164947; RL-82-013) Avail: NTIS HC A03/MF A01 CSCL 03B

NGC 4151 was monitored with the international Ultraviolet Explorer (UE) satellite and the results compared with those from photograph measurements made at the Royal Greenwich Observatory and X-ray observations) (2-10keV) made with the SSI on Ariel 5 and the MPC (Einstein Laboratory). Explanations were developed for the erratic behavior of the UV light curve and the shape of the continuum. It is concludes that X-rays come from a much smaller region than the UV photons and that energetic events occurring in the two wavelength bands are not correlated or that the manifestations of the same event are separated by a few, or more than 10 to 15 days. Implications of these results to current theoretical models are discussed. GRA

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights. For spacecraft design see *18 Spacecraft Design Testing, and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

N83-30339*# Lewis (John S.) Associates, Inc., Tucson, Ariz.
PLANETARY ATMOSPHERES PROGRAM Final Technical Report, 15 May 1982 - 15 May 1983
[1982] 71 p refs
(Contract NASw-3625)
(NASA-CR-172879; NAS 1.26:172879) Avail: NTIS HC A04/MF A01 CSCL 03B

Non-solar compositional models of the troposphere of Jupiter, halide cloud condensation and volatile element inventories on Venus, and shock-wave processing of interstellar cloud materials are discussed. Author

N83-30340*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
PIONEER VENUS
Richard O. Fimmel, Lawrence Colin, and Eric Burgess 1983 254 p refs Original contains color illustrations
(NASA-SP-461) Avail: NTIS MF A01; SOD HC $11.00 CSCL 03B

Venus before Pioneer, the Pioneer Venus mission, Pioneer Venus spacecraft, scientific investigation, mission to Venus scientific results, and results of Soviet studies of Venus are addressed. A chronology of exploration of Venus from Earth before the Pioneer Venus mission and Venus nomenclature and mythology are provided. Author

N83-30341*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
INFRARED RADIATION AND INVERSION POPULATION OF CO2 LASER LEVELS IN VENUSIAN AND MARTIAN ATMOSPHERES
B. F. Gordiyets and V. Ya. Panchenko May 1983 33 p refs Transl. into ENGLISH of "Ik Izlucheniye i Inversnaya Zaselennost" Preprint-207 Moscow, 1982 p 1-37
(NASA-TM-85057; NAS 1.15:85057; Preprint-207) Avail: NTIS HC A03/MF A01 CSCL 03B

Formation mechanisms of nonequilibrium 10 micron CO2 molecule radiation and the possible existence of a natural laser effect in the upper atmospheres of Venus and Mars are theoretically studied. An analysis is made of the excitation process of CO2 molecule vibrational-band levels (with natural isotropic content) induced by direct solar radiation in bands 10.6, 9.4, 4.3, 2.7 and 2.0 microns. The model of partial vibrational-band temperatures was used in the case. The problem of IR radiation transfer in vibrational-rotational bands was solved in the radiation escape approximation. Author

N83-30342*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MODELLING OF THE 10-MICROMETER NATURAL LASER EMISSION FROM THE MESOSPHERES OF MARS AND VENUS
D. Deming and M. J. Mumma Jun. 1983 37 p refs
(NASA-TM-85045; NAS 1.15:85045) Avail: NTIS HC A03/MF A01 CSCL 03B

The NLTE radiative transfer problem is solved to obtain the 00 deg 1 vibrational state population. This model successfully reproduces the existing center-to-limb observations, although higher spatial resolution observations are needed for a definitive test. The model also predicts total fluxes which are close to the observed values. The strength of the emission is predicted to be closely related to the instantaneous near-IR solar heating rate. Author

N83-30343*# National Aeronautics and Space Administration, Washington, D. C.
RECONSTRUCTION OF THE H2O PROFILE FROM THE RESULTS OF MODELING THE HEAT FLUX IN THE LOWER ATMOSPHERE OF VENUS
M. Ya. Marov, A. P. Galtsev, and V. P. Shari May 1983 14 p refs Transl. into ENGLISH of "Vosstanovleniye Profilya H2O po Rezultatam Modelirovaniya Teplovogo Potoka v Nizhney Atmosfere Venery" Preprint 164 Moscow, 1982 p 1-15
(Contract NASw-3542)
(NASA-TM-77216; NAS 1.15:77216; Preprint-164) Avail: NTIS HC A02/MF A01 CSCL 03B

The H2O profile in the Venus lower atmosphere is reconstructed by the effective radiation flux data. It is shown that the H2O vapor abundance is concentrated mainly in the 20 to 48 km layer and depends on measurement time and location. The magnitudes of H2O optically determined are much less than those obtained by probing, especially below 20 km. Author

N83-30344*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
INFRARED MOLECULAR EMISSIONS FROM COMETS
H. A. Weaver and M. J. Mumma Jul. 1983 67 p refs
(NASA-TM-85067; NAS 1.15:85067) Avail: NTIS HC A04/MF A01 CSCL 03B

The possibility of detecting IR molecular line emission from cometary parent molecules is explored. Due to the non-LTE conditions in the inner coma and the large amount of near IR solar flux, IR fluorescence will be a significant source of cometary emission and, in fact, will dominate the grain radiation in a sufficiently high resolution instrument. The detection of this line emission will be difficult due to absorption in the terrestrial atmosphere, but it appears possible to measure cometary H2O emission from airplane altitudes. As IR molecular line emission

represents one of the few promising methods of detecting cometary parent molecules directly, further research on this problem should be vigorously pursued. Author

N83-30345*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
CURRENTS IN SATURN'S MAGNETOSPHERE
John E. Connerney, M. H. Acuna, and N. F. Ness Jun. 1983 46 p refs
(NASA-TM-85055; NAS 1.15:85055) Avail: NTIS HC A03/MF A01 CSCL 03B

A model of Saturn's magnetospheric magnetic field is obtained from the Voyager 1 and 2 observations. A representation consisting of the Z sub 3 zonal harmonic model of Saturn's planetary magnetic field together with an explicit model of Saturn's planetary magnetic field and a model of the equatorial ring current fits the observations well within r < 20 R sub S, with the exception of data obtained during the Voyager 2 inbound pass. Author

N83-30346*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
STRUCTURE AND DYNAMICS OF SATURN'S OUTER MAGNETOSPHERE AND BOUNDARY REGIONS
Kenneth W. Behannon, R. P. Lepping, and Norman F. Ness May 1983 35 p refs
(NASA-TM-85065; NAS 1.15:85065) Avail: NTIS HC A03/MF A01 CSCL 03B

In 1979-1981, the three USA spacecraft Pioneer 11 and Voyagers 1 and 2 discovered and explored the magnetosphere of Saturn to the limited extent possible on flyby trajectories. Considerable variation in the locations of the bow shock (BS) and magnetopause (MP) surfaces were observed in association with variable solar wind conditions and, during the Voyager 2 encounter, possible immersion in Jupiter's distant magnetic tail. The limited number of BS and MP crossings were concentrated near the subsolar region and the dawn terminator, and that fact, together with the temporal variability, makes it difficult to assess the three dimensional shape of the sunward magnetospheric boundary. The combined BS and MP crossing positions from the three spacecraft yield an average BS-to-MP stagnation point distance ratio of 1.29 +/- 0.10. This is near the 1.33 value for the Earth's magnetosphere, implying a similar sunward shape at Saturn. Study of the structure and dynamical behavior of the outer magnetosphere, both in the sunward hemisphere and the magnetotail region using combined plasma and magnetic field data, suggest that Saturn's magnetosphere is more similar to that of Earth than that of Jupiter. Author

N83-29283# Joint Publications Research Service, Arlington, Va.
ROBOTS ON VENUS
V. G. Perminov and O. S. Fedorov *In its* USSR Rept.: Space, No. 22 (JPRS-83612) 6 Jun. 1983 p 25-32 Transl. into ENGLISH from Zemlya i Vselennaya (Moscow), no. 1, Jan. - Feb. 1983 p 32-36 (For primary document see N83-29280 18-12)
Avail: NTIS HC A06

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N83-30347*# Stanford Univ., Calif. Inst. for Plasma Research.
SPICULES AND SURGES. PART 1: EXAMINATION OF TWO POSSIBLE MODELS
M. L. Blake and P. A. Sturrock Jan. 1983 22 p refs
(Grant NAGw-92; Contracts NGL-05-020-272; N00014-75-C-0673)
(NASA-CR-172778; NAS 1.26:172778; AD-A125042;
SU-SUIPR-949) Avail: NTIS HC A02/MF A01 CSCL 12A

We adopt the position that spicules, macrospicules and surges are manifestations of the same phenomenon occurring on different scales. We therefore search for a mechanism which can be successfully applied to explain the phenomenon on all three scales. We first consider the possibility that the mechanism is the same as that which operates in producing the solar wind, except that the divergence of the magnetic ducts is much more rapid. We find that the mechanism fails to explain spicules, macrospicules or surges. For instance, if it produces speeds typical of spicules, the maximum height is much too small; if it reproduces the height, the required velocities are much too high. We also consider a variant of this mechanism proposed by Uchida in which the gas pressure is supplemented by the magnetic pressure of a gas composed of plasmoids. This mechanism also fails for similar reasons. Author (GRA)

N83-30348*# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
SOLAR OBSERVATIONS DURING SKYLAB, APRIL 1973 - FEBRUARY 1974. 1: CORONAL X-RAY STRUCTURE. 2: SOLAR FLARE ACTIVITY
J. M. Hanson (Michigan Univ., Ann Arbor), E. C. Roelof, and R. E. Gold Boulder, Colo. World Data Center A for Solar-Terrestrial Physics Feb. 1983 49 p refs
(Grant NsG-7055; Contract N00024-78-C-5384;
MIPR-FY71218100001)
(NASA-CR-172824; NAS 1.26:172824; AD-A125363;
AFGL-TR-83-0049; UAG-79) Avail: NTIS HC A03/MF A01 CSCL 03/2

Large-scale (approx 10 deg) emission features visible in soft X-ray photographs from the American Science and Engineering, Inc. (AS&E) spectrographic telescope S-054 on Skylab have been superposed on H-alpha Synoptic Charts (McIntosh, 1975) for Carrington Rotations 1601 through 1610. The charts identify loop arcades and loop complexes associated with strong magnetic fields, as well as coronal holes and areas devoid of emission loops. Although not adequate for the study of the geometry of individual features, the charts convey a global sense of coronal structure which is often difficult to obtain from individual (disk) images. GRA

N83-30349# Sonicraft, Inc., Chicago, Ill.
SINGLE AND MULTIPLE SCATTERED SOLAR RADIATION Final Report, Sep. 1980 - Jun. 1982
W. L. Ridgway, R. A. Moose, and A. C. Cogley 30 Aug. 1982 199 p refs
(Contract F19628-80-C-0180; AF Proj. 7670)
(AD-A126323; AFGL-TR-82-0299) Avail: NTIS HC A09/MF A01 CSCL 20/6

Mie calculations are performed to produce complete scattering properties for various aerosol models contained in LOWTRAN's model atmospheres. Those properties are used in a solar single scattering approximation for inhomogeneous spherical atmospheres based on LOWTRAN's transmission functions. A multiple scattering adding/doubling code for plane-paralle atmospheres is developed and can be used to represent multiple scattered radiative fields in spherical atmospheres over a wide range of angle and path parameters. All data and codes are documented so they can be used in future research.Author (GRA)

93 SPACE RADIATION

Includes cosmic radiation; and inner and outer Earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

N83-30350*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A STUDY OF THE TEMPORAL AND SPECTRAL CHARACTERISTICS OF GAMMA RAY BURSTS Ph.D. Thesis - Maryland Univ.
Jay Norris May 1983 279 p refs Submitted for publication
(NASA-TM-85031; NAS 1.15:85031) Avail: NTIS HC A13/MF A01 CSCL 03B

Gamma-ray burst data obtained from the ISEE-3 Gamma Ray Burst Spectrometer and the Solar Maximum Mission's Hard X-ray Burst Spectrometer (HXRBS) were analyzed to yield information on burst temporal and spectral characteristics. A Monte Carlo approach was used to simulate the HXRBS response to candidate spectral models. At energies above about 100 keV, the spectra are well fit by exponential forms. At lower energies, 30 keV to 60 keV, depressions below the model continua are apparent in some bursts. The depressions are not instrumental or data-reduction artifacts. The event selection criterion of the ISEE-3 experiment is based on the time to accumulate a present number of photons rather than the photon count per unit time and is consequently independent of event duration for a given burst intensity, unlike most conventional systems. As a result, a significantly greater percentage of fast, narrow events have been detected. The ratio of count rates from two ISEE-3 detectors indicates that bursts with durations < or approx. one second have much softer spectra than longer bursts. Author

N83-30351*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
HIGH ENERGY ASTROPHYSICS LABORATORY CONTRIBUTIONS TO THE 18TH INTERNATIONAL COSMIC RAY CONFERENCE
May 1983 53 p refs Conf. to be held in Bangalore, India, 22 Aug. - 3 Sep. 1983
(NASA-TM-85034; NAS 1.15:85034) Avail: NTIS HC A04/MF A01 CSCL 03B

Gamma ray astrophysics, cosmic rays, solar modulation, solar particles, and instrumentation are addressed. Author

N83-30352# University Coll., London (England). Mullard Space Science Lab.
EINSTEIN X-RAY OBSERVATIONS OF CATACLYSMIC VARIABLES
K. O. Mason and F. A. Cordova 1982 19 p refs Presented at the COSPAR Meeting, Ottawa, 22-29 May, 1982
(Contract W-7405-eng-36)
(DE82-015804; LA-UR-82-1238; CONF-820582-1) Avail: NTIS HC A02/MF A01

Observations with the imaging X-ray detectors on the Einstein Observatory led to a large increase in the number of low luminosity X-ray sources known to be associated with cataclysmic variable stars (CVs). The high sensitivity of the Einstein instrumentation permitted study of their short timescale variability and spectra. The data are adding significantly to knowledge of the accretion process in cataclysmic variables and forcing some revision in ideas concerning the origin of the optical variability in these stars. DOE

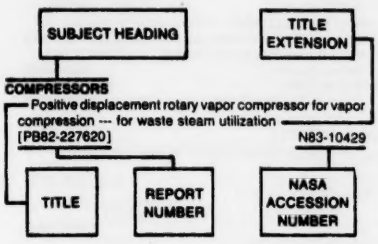
99 GENERAL

N83-30353# Office of Naval Research, London (England).
EUROPEAN SCIENTIFIC NOTES, VOLUME 36, NUMBER 12
Robert L. Carovillano, ed., Larry E. Shaffer, ed., and Francis A. Richards, ed. 31 Dec. 1982 56 p
(AD-A126057; ESN-36-12) Avail: NTIS HC A04/MF A01 CSCL 05/2

European Scientific Notes (ESN) is a monthly publication with brief articles on recent developments in European Scientific research. Articles presented in this report follow: Artificial Skin Sensors in Robots and Biology; Hyperbaric Evacuation Seminar;. Fourteenth Europhysics Conference on Macromolecular Physics--Polymer Crystals: Structure and Morphology; A Data Flow Computer at the Univ. of Manchester; NATO Workshop on Distributed System Design Methodology; Symposium on Industrial Robots--Japanese, European, and American; Microelectronics technology; Electronic Devices to Exploit Langmuir-Blodgett Films? Line XR7 for X-ray Topography and Interferometry at the Daresbury Synchrotron Radiation Source; Center for Materials Science and Technology, Univ. of Durham, UK; The Centenary Celebration of Fisheries Research in Scotland; Operations Research Applications on Microcomputers; The Daresbury Synchrotron Radiation Source; A Dutch Diagnostic Sampler; The Eighth Symposium on Microdosimetry; and Statistics Research at the Univ. of Birmingham. GRA

SUBJECT INDEX

Typical Subject Index Listing



The subject heading is the key to the subject content of the document. Titles, report numbers, and accession numbers of pertinent documents are provided under each subject heading. When the title is insufficiently descriptive of the document content, a title extension has been added, separated from the title by three hyphens. The report number helps to indicate the type of document cited (e.g., NASA report, NASA translation, NASA contractor report). The NASA accession number is the number by which the document abstracts are arranged in this journal and by which the document is sold or requested. The titles, with title extensions if present, are arranged under each subject heading in ascending accession number order. The subject headings have been selected from the latest revision of the *NASA Thesaurus* (NASA SP-7051).

A

ABILITIES
The event related brain potential as an index of information processing, cognitive activity, and skill acquisition: A program of basic research
[AD-A125699] N83-29999

ABLATION
Graphite ablation in several gas environments
[AD-A125511] N83-29319

ABRASION
Environmental degradation of solar optical materials. Volume 1: Literature survey
[DE83-010298] N83-29837

ABSORPTION
Model of the steady-state performance of an absorption heat pump
[PB83-152314] N83-29471

ABSORPTION SPECTRA
Theory of reactions at a solid surface
[AD-A126202] N83-29697
Structures and polarized electronic absorption spectra of dimolybdenum tetraformate crystals
[DE83-004863] N83-30281

ABSTRACTS
Foreign technology alert-bibliography: Ceramics, refractories and glass technology
[PB83-101642] N83-29323
Proceedings of the 6th Annual Conference on Fire Research
[PB83-155887] N83-29463
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172901] N83-30057
Representation of multivariate functions
[AD-A125898] N83-30132
EIA Data Index: An abstract journal. Third supplement, Jul.-Dec. 1981
[DE83-006533] N83-30311

ACCELERATION (PHYSICS)
The modern concept of acceleration control: Introduction to optimal command in a handling by objective structure N83-29267
Static and seismic lateral pressures on Earth retaining structures, appendices
[PB83-164335] N83-29476
Selective non-resonant acceleration of 3He++ and heavy ions by H+ cyclotron waves
[NASA-CR-172820] N83-30182

ACCELERATION PROTECTION
Investigation of crew restraint system biomechanics
[AD-A126199] N83-29190

ACCELERATION TOLERANCE
Some vibration data on primates implanted with accelerometers on the upper and lower spine: Methodology and results in Rhesus monkeys
[AD-A125545] N83-29969

ACCESS CONTROL
Automated protocol verification
[AD-A126271] N83-30066

ACCIDENTS
Further development of Kospas-Salyut system N83-29287

ACCRETION DISKS
Einstein X-ray observations of cataclysmic variables
[DE82-015804] N83-30352

ACCURACY
Modeling of the Mode S tracking system in support of aircraft safety research
[NASA-CR-166486] N83-29186
Design analysis and performance evaluation of a two-dimensional camera for accelerated positron-emitter beam injection by computer simulation
[DE83-005866] N83-29661
Executive committee report: Geotechnical instrumentation working group meeting
[DE82-012837] N83-29664
Improving the accuracy of thermocouple temperature measuring circuits --- jet engines
[PNR-90148] N83-29670
Selection of repetition frequencies for laser rangefinders
[AD-A126188] N83-29695
Dual tracer measurements of plume depletion
[DE83-005551] N83-29873
Finite-difference, spectral and Galerkin methods for time-dependent problems
[NASA-CR-172149] N83-30110

ACETATES
Applications of ethylene vinyl acetate as an encapsulation material for terrestrial photovoltaic modules
[NASA-CR-172862] N83-29809

ACID BASE EQUILIBRIUM
Domestic swine in physiological research. Part 4: A blood acid-base curve nomogram for immature pigs
[AD-A126081] N83-29971

ACID RAIN
Finalization of reports entitled Updated Acid Rain Information Book and Simplification Approaches to Protecting PSD Class I Areas
[DE83-008771] N83-29877

ACIDITY
Studies of the gas- and aqueous-phase composition of stratiform clouds
[DE83-005912] N83-29872
Cloudwater acidity measurements and formation mechanisms: Experimental design
[DE83-005911] N83-29874
Acidity, nutrients and minerals in atmospheric precipitation over Florida: Deposition patterns, mechanisms and ecological effects
[PB83-165837] N83-29888

ACOUSTIC MEASUREMENT
Objective acoustic quality inspection by pattern recognition and signal analysis. Design of an inspection system and application to an electric motor
[BMFT-FB-T-83-005] N83-29619

ACOUSTIC PROPAGATION
The S-matrix and acoustic signal structure in simple and compound waveguides
[AD-A125583] N83-30129

ACOUSTIC SCATTERING
Least-square iterative technique for solving time-domain scattering problems
[PB83-164913] N83-30143

ACOUSTIC VELOCITY
Blast attenuation in a shot tunnel using water jets
[DE82-018508] N83-29646
The long term upper ocean study (LOTUS) cruise summary and hydrographic data report OCEANUS 119, May 1982
[AD-A125737] N83-29956

ACOUSTICS
Intrinsically irreversible heat engines
[DE82-015729] N83-29853
Numerical calculations of ultrasonic fields
[DE82-013811] N83-30189

ACOUSTO-OPTICS
Performance of laser beam wavefront sensor
[AD-A125432] N83-29691

ACTIVATION ENERGY
Relative catalytic activity of iron containing minerals for the hydrogasification of coal
[DE82-012776] N83-29337
Oxygen diffusion of anodic surface oxide film on titanium studied by Auger electron spectroscopy
[DE82-013653] N83-29340
Studies of dry-powder extinguishment of diffusion flames for condensed fuels
[PB83-150656] N83-29348
Compatability and accelerated aging study for Li(Si)FeS2 thermally activated batteries
[DE82-009026] N83-29817

ACTIVE CONTROL
ACOSS twelve (Active Control of Space Structures)
[AD-A126053] N83-29307

ACTUATION
Guidance and actuation techniques for an adaptively controlled vehicle
[AD-A126296] N83-30037

ACTUATORS
Electrothermal response testing: A component development tool
[DE82-012694] N83-29617

ADAPTATION
Jam resistant communications systems techniques
[AD-A126217] N83-29579

ADAPTIVE CONTROL
Study of an automatic trajectory following control system
[NASA-CR-166121] N83-29271
Proceedings of the AGARD Fluid Dynamics Specialists Meeting on Wall Interference in Wind Tunnels
[AGARD-AR-190] N83-29277
Reactively steered adaptive array using microstrip patch elements at 4 gigahertz
[AD-A126298] N83-29570
Guidance and actuation techniques for an adaptively controlled vehicle
[AD-A126296] N83-30037
Algorithms and data structures for adaptive multigrid elliptic solvers
[NASA-CR-172158] N83-30056

ADDITIVES
The adsorption and thermal decomposition of tricresylphosphate (TCP) on iron and gold
[NASA-TM-83341] N83-29311
Evaluation of fuel additives for reduction of material imcompatibilities in methanol-gasoline blends
[NASA-CR-168061] N83-29359
Influence of selected additives and CaO:SiO2 ratio on high-temperature strength of MgO refractories
[PB83-157875] N83-29410

ADHESIVE BONDING
Elastomer toughened polyimide adhesives
[NASA-LAR-12775-2] N83-29390
A solvent resistant, thermoplastic aromatic poly(imidesulfone) and process for preparing same
[NASA-CASE-LAR-12858-2] N83-29391

ADHESIVES
Influence of adhesive shear deformation on laminate structural behavior with application to parabolic trough solar collectors
[DE83-010293] N83-29838
ADIABATIC CONDITIONS
Stirling engine design manual, 2nd edition
[NASA-CR-168088] N83-30328
ADJOINTS
Non-self-adjoint inverse spectral theoretic derivation of a complex von Neumann-Wigner potential
[DE83-009064] N83-30137
ADSORBENTS
Porous polymers as adsorbent for mustard gas
[PML-1981-46] N83-29389
ADSORPTION
The adsorption and thermal decomposition of tricresylphosphate (TCP) on iron and gold
[NASA-TM-83341] N83-29311
Direct enzymatic extraction of starch from corn as an energy-saving alternative to production of high-fructose syrup
[DE82-008314] N83-29822
Analysis of the adsorption process and of desiccant cooling systems: A pseudo- steady-state model for coupled heat and mass transfer
[DE83-005752] N83-29828
ADVECTION
Stability analysis of finite difference schemes for the advection-diffusion equation
[NASA-CR-172823] N83-30123
AERIAL EXPLOSIONS
Estimates of air-column density evolution behind strong airblasts
[DE82-016313] N83-29645
AERIAL PHOTOGRAPHY
Water penetration photogrammetry. Volume 1: Feasibility and evaluation study
[AD-A126209] N83-29291
Matching edges in maps and aerial images using the chamfer matching algorithm
[FOA-C-30315-E1] N83-29791
Evaluation of the tropical cyclone spiral linearization technique
[AD-A126007] N83-29934
AERIAL RECONNAISSANCE
Real-time quality control of SAOs
[PB83-166082] N83-29944
AEROACOUSTICS
Turbulence spectra in the noise source regions of the flow around complex surfaces
[NASA-TM-83392] N83-30168
AERODYNAMIC BALANCE
Designing for fighter engine transients N83-29243
AERODYNAMIC CHARACTERISTICS
Turbine tip clearance control in gas turbine engines N83-29254
Test facility for basic research on distortion N83-29258
AERODYNAMIC COEFFICIENTS
V/STOL fountain force coefficient
[AD-A126261] N83-29200
The drag coefficient of cylindrical spacecraft in orbit at altitudes greater than 150 km
[NASA-TM-85043] N83-29294
AERODYNAMIC DRAG
The drag coefficient of cylindrical spacecraft in orbit at altitudes greater than 150 km
[NASA-TM-85043] N83-29294
AERODYNAMIC HEATING
Predictions of entry heating for lower surface of shuttle orbiter
[NASA-TM-84624] N83-29631
AERODYNAMIC INTERFERENCE
Proceedings of the AGARD Fluid Dynamics Specialists Meeting on Wall Interference in Wind Tunnels
[AGARD-AR-190] N83-29277
AERODYNAMIC LOADS
A continuous vorticity panel method for the prediction of steady aerodynamic loads on lifting surfaces N83-29172
Wind-tunnel investigation of aerodynamic loading on a 0.237-scale model of a remotely piloted research vehicle with a thick, high-aspect-ratio supercritical wing
[NASA-TM-84614] N83-29176
The Department of Energy (DOE) research program in structural analysis of vertical-axis wind turbines
[DE82-017072] N83-29858
AERODYNAMIC STABILITY
Validation flight test of UH-60A for Rotorcraft Systems Integration Simulator (RSIS)
[AD-A125428] N83-29201
Applications of a compression system stability model N83-29260
Modelling compression component stability characteristics: Effects of inlet distortion and fan bypass duct disturbances N83-29261
AERODYNAMIC STALLING
Engine Handling
[AGARD-CP-324] N83-29241
Some general topics in the field of engine handling N83-29242
Flight test experience on military aircraft engine handling N83-29248
AERODYNAMICS
A numerical study of Strake aerodynamics
[AD-A125882] N83-29182
Numerical simulation of vortex breakdown by the vortex-filament method
[NASA-TM-84334] N83-29636
Scientific and technical information output of the Langley Research Center for calendar year 1982
[NASA-TM-84615] N83-30306
AEROELASTICITY
Vibration and aeroelastic facility
[AD-A126317] N83-29275
AERONAUTICAL ENGINEERING
Scientific and technical information output of the Langley Research Center for calendar year 1982
[NASA-TM-84615] N83-30306
AEROSOLS
Diffusion-flame studies of the chemical and physical mechanisms of soot formation from aromatic and substituted-aromatic fuels
[DE83-009093] N83-29334
Scattering and absorption by atmospheric aerosol models N83-29542
NBS portable ambient particulate sampler
[PB83-165019] N83-29679
Multiple scattering effects in aerosols: Theoretical investigations
[AD-A125480] N83-29693
Remote sensing of surface propagation parameters: Application of imagery simulation model results
[AD-A125513] N83-29785
Cloudwater acidity measurements and formation mechanisms: Experimental design
[DE83-005911] N83-29874
AEROSPACE ENGINEERING
Space science research in the US: A technical memorandum
[PB83-166512] N83-30303
Scientific and technical information output of the Langley Research Center for calendar year 1982
[NASA-TM-84615] N83-30306
AEROSPACE ENVIRONMENTS
USSR report: Space, No. 22
[JPRS-83612] N83-29280
Design and development of multi-kW power electronic transformers --- for long duration space applications
[NASA-CR-168082] N83-29596
AEROSPACE INDUSTRY
Combustion Fundamentals Research
[NASA-CP-2268] N83-29208
Considerations of technology transfer barriers in the modification of strategic superalloys for aircraft turbine engines
[NASA-TM-83395] N83-29360
AEROSPACE MEDICINE
Aerospace medicine and biology: A continuing bibliography with indexes (supplement 247)
[NASA-SP-7011(247)] N83-29989
AEROSPACE SCIENCES
Space science research in the US: A technical memorandum
[PB83-166512] N83-30303
AEROSPACE SYSTEMS
ACOSS twelve (Active Control of Space Structures)
[AD-A126053] N83-29307
AEROSPACE TECHNOLOGY TRANSFER
USSR report: Space, No. 22
[JPRS-83612] N83-29280
Considerations of technology transfer barriers in the modification of strategic superalloys for aircraft turbine engines
[NASA-TM-83395] N83-29360
Space science research in the US: A technical memorandum
[PB83-166512] N83-30303
AEROTHERMODYNAMICS
An overview of engine dynamic response and mathematical modeling concepts N83-29262
AFRICA
Statistics of radio refractivity and atmospheric attenuation in tropical climates --- Africa N83-29505
AFTERBURNING
Throttle handling related to J85 engine performance and durability: Canadian forces experience N83-29249
Operational and maintenance aspects of the introduction of an advanced fighter type N83-29250
A new approach to reheat control N83-29268
AFTERGLOWS
Diagnostics development for E-beam excited air channels. Conductivity measurements in air afterglows
[AD-A125997] N83-30174
AGGREGATES
Evaluation of the ORNL residential energy-use model
[DE82-905768] N83-29820
AGING (MATERIALS)
The duration period of propellants for classical and rocket armament
[AD-A126219] N83-29417
AGING (METALLURGY)
Compatability and accelerated aging study for Li(Si)FeS2 thermally activated batteries
[DE82-009026] N83-29817
AGRICULTURE
LANDSAT-4 hightlights N83-29755
SERI Biomass Program
[DE83-009763] N83-29845
Assessing very long-range impacts from a rapid climate change
[DE82-017229] N83-29937
AGRISTARS PROJECT
Analytical design of multispectral sensors
[E83-10337] N83-29748
AGROCLIMATOLOGY
Satellite freeze forecast system: Executive summary
[E83-10368] N83-29778
Satellite freeze forecast system
[E83-10369] N83-29779
Satellite freeze forecast system. System configuration definition manual
[E83-10370] N83-29780
Satellite freeze forecast system. Operating/troubleshooting manual
[E83-10371] N83-29781
Satellite freeze forecast system. System software documentation manual
[E83-10372] N83-29782
AIR CONDITIONING
Development of a solar-desiccant dehumidifier, phase 2
[DE83-005407] N83-29829
AIR CURRENTS
The operational meteorology of convective weather. Volume 1: Operational mesoanalysis
[PB83-162321] N83-29941
AIR FLOW
Warm air systems. Part 1: Temperatures and temperature efficiencies
[PB83-148908] N83-29484
Development of a solar-desiccant dehumidifier, phase 2
[DE83-005407] N83-29829
Improved simulations of mesoscale meteorology
[AD-A125815] N83-29928
AIR INTAKES
Experience with the KHD APU T312 for a modern fighter type N83-29251
AIR JETS
Analytical calculation of a single jet in cross-flow and comparison with experiment N83-29219
AIR LAW
Legal delimitation of airspace N83-29290
AIR POLLUTION
National performance audit program: The 1980 proficiency survey for sulfur dioxide, nitrogen dioxide, carbon monoxide, sulfate, nitrate, lead and high volume flow
[PB83-164863] N83-29354
Summary of status of Environmental Protection Agency (EPA), Office of Mobile Sources Characterization Projects as of March, 1982
[PB83-163972] N83-29441
Warm air systems. Part 1: Temperatures and temperature efficiencies
[PB83-148908] N83-29484
Emission characterization of a spark-ignited, heavy-duty, direct-injected methanol engine
[PB83-156372] N83-29722
Dual tracer measurements of plume depletion
[DE83-005551] N83-29873
Airborne field study of power plant plume dispersion in stable atmospheres
[PB83-168930] N83-29887
Air pollutant production by algal cell cultures N83-30032
User's instructions for the SHORTZ and LONGZ computer programs, volume 1
[PB83-146100] N83-30093
AIR QUALITY
VOC (Volatile Organic Compound) fugitive emissions in petroleum refining industry: Background information for proposed standards
[PB83-157743] N83-29885

Airborne field study of power plant plume dispersion in stable atmospheres
[PB83-168930] N83-29887

AIR TRAFFIC
Modeling of the Mode S tracking system in support of aircraft safety research
[NASA-CR-166486] N83-29186

AIR TRAFFIC CONTROL
Evaluation of an airborne terminal for a digital data link in aviation
[DFVLR-FB-83-05] N83-29196

AIR WATER INTERACTIONS
A contribution to the numerical description of rotating two phase flow --- computer code development, gas-liquid flow
[WTHD-153] N83-29647
Formulation of a prototype coupled atmospheric and oceanic boundary layer model
[AD-A126000] N83-29951
On the stress-shear relation near a turbulent air-sea interface
[AD-A126252] N83-29952

AIRBORNE EQUIPMENT
Design and development of a disc-windmill atomizer for aerial applications
[AE-8223] N83-29449
Helicopter-borne scatterometer
[AD-A125796] N83-29561
Atomizers for the aerial application of herbicides: Ideal and available
[CA-8207] N83-29632
Airborne laser hydrography, FY 1983. Issue paper
[PB83-158451] N83-29964

AIRBORNE/SPACEBORNE COMPUTERS
Evaluation of an airborne terminal for a digital data link in aviation
[DFVLR-FB-83-05] N83-29196

AIRCRAFT ACCIDENTS
Air disaster litigation
[GPO-97-336] N83-29185
A survey of serious aircraft accidents involving fatigue fracture. Volume 1: Fixed-wing aircraft
[NAE-AN-7] N83-29187
A survey of serious aircraft accidents involving fatigue fracture. Volume 2: Rotary-wing aircraft
[NAE-AN-8] N83-29188
Further development of Kospas-Salyut system N83-29287
The bush pilot syndrome: A critical incident analysis N83-30008

AIRCRAFT ANTENNAS
Jam resistant communications systems techniques
[AD-A126217] N83-29579

AIRCRAFT CONSTRUCTION MATERIALS
Curved cap corrugated sheet
[NASA-CASE-LAR-12884-1] N83-29446

AIRCRAFT CONTROL
TRAGEN: Computer program to simulate an aircraft steered to follow a specified verticle profile. User's guide
[NASA-CR-166062] N83-30062

AIRCRAFT ENGINES
Airworthiness and Flight Characteristics test (A&FC) of AH-1S with Aircraft General Purpose Dispenser System (AGPDS)
[AD-A125978] N83-29199
Multi-fuel rotary engine for general aviation aircraft
[NASA-TM-83429] N83-29235
Engine Handling
[AGARD-CP-324] N83-29241
Some general topics in the field of engine handling N83-29242
A look at engine handling aspects from aircraft flight test experience; with an outlook for future requirements N83-29245
Operational engine usage N83-29246
Handling combat engines: The pilots viewpoint --- Mirage 2000 aircraft N83-29247
Throttle handling related to J85 engine performance and durability: Canadian forces experience N83-29249
Operational and maintenance aspects of the introduction of an advanced fighter type N83-29250
Experience with the KHD APU T312 for a modern fighter type N83-29251
Mechanical and thermal effects on the transient and steady state component performance of gas turbines N83-29252
Turbine tip clearance control in gas turbine engines N83-29254
Models for predicting tip clearance changes in gas turbines N83-29255
Deterioration in service of engine transient behaviour N83-29256
Applications of a compression system stability model N83-29260
Generalized digital simulation technique with variable engine parameter input for steady state and transient behaviour of aero gas turbines N83-29263
The modern concept of acceleration control: Introduction to optimal command in a handling by objective structure N83-29267
Considerations of technology transfer barriers in the modification of strategic superalloys for aircraft turbine engines
[NASA-TM-83395] N83-29360
Research to develop and evaluate advanced eddy current sensors for detecting small flaws in metallic aerospace components
[AD-A125873] N83-29726

AIRCRAFT EQUIPMENT
Investigation of crew restraint system biomechanics
[AD-A126199] N83-29190

AIRCRAFT FUELS
Alternative fuel technology series. Volume 1: Alternative fuels for transport
[ISBN-0-902937-63-4] N83-29414

AIRCRAFT MAINTENANCE
Operational and maintenance aspects of the introduction of an advanced fighter type N83-29250

AIRCRAFT NOISE
Minimum noise impact aircraft trajectories N83-29191
Development of rotorcraft interior. Noise control concepts. Phase 1: Definition study
[NASA-CR-166101] N83-30166

AIRCRAFT PERFORMANCE
Mechanical and thermal effects on the transient and steady state component performance of gas turbines N83-29252

AIRCRAFT PILOTS
The bush pilot syndrome: A critical incident analysis N83-30008

AIRCRAFT RELIABILITY
Airworthiness and Flight Characteristics test (A&FC) of AH-1S with Aircraft General Purpose Dispenser System (AGPDS)
[AD-A125978] N83-29199

AIRCRAFT SAFETY
Extended moment arm anti-spin device
[NASA-CASE-LAR-12979-1] N83-29173
Modeling of the Mode S tracking system in support of aircraft safety research
[NASA-CR-166486] N83-29186
Advanced structures technology and aircraft safety
[NASA-TM-85664] N83-29733

AIRCRAFT SPIN
Extended moment arm anti-spin device
[NASA-CASE-LAR-12979-1] N83-29173

AIRCRAFT STRUCTURES
Adaptation of pultrusion to the manufacture of helicopter components
[AD-A126291] N83-29171

AIRFOILS
Axial compressor middle stage secondary flow study
[NASA-CR-3701] N83-29174
Small transport aircraft technology propeller study
[NASA-CR-166045] N83-29178

AIRFRAME MATERIALS
Advanced structures technology and aircraft safety
[NASA-TM-85664] N83-29733

AIRFRAMES
Small transport aircraft technology propeller study
[NASA-CR-166045] N83-29178
Development of monofilar rotor hub vibration absorber
[NASA-CR-166088] N83-29272

AIRGLOW
Coordinated ground-based measurements at Chatanika: Auroral spatial and temporal structures
[AD-A126113] N83-29900

AIRPORTS
Terminal forecast reference notebook for RAF Fairford, United Kingdom
[AD-A126095] N83-29930
Terminal forecast reference notebook for Feucht AAF, Germany
[AD-A126096] N83-29931
Terminal forecast reference notebook for Katterbach AAF, Germany
[AD-A126097] N83-29932

AIRSPEED
OPTIM: Computer program to generate a vertical profile which minimizes aircraft fuel burn or direct operating cost. User's guide
[NASA-CR-166061] N83-30061

ALCOHOLS
Materials compatibility studies with fuel/alcohol mixtures
[AD-A126076] N83-29416
Alcohol-Fuels Grant Program. Low-energy route for alcohol/gasohol recovery from fermentor beer
[DE83-009665] N83-29423
Emission characterization of a spark-ignited, heavy-duty, direct-injected methanol engine
[PB83-156372] N83-29722

ALGAE
Effects of uranium oxides on some of the algae native to Eglin Air Force Base, Florida
[AD-A125478] N83-29970
Air pollutant production by algal cell cultures N83-30032

ALGEBRA
The structure of divide and conquer algorithms
[AD-A126086] N83-30124

ALGORITHMS
Finite area method for nonlinear supersonic conical flows
[NASA-CR-172148] N83-29177
Multiaccess of a slotted channel using a control mini-slot
[AD-A125569UVA-525634/EE82/106] N83-29562
A note on beamforming algorithms
[AD-A126275] N83-29564
Multidimensional signal restoration and band-limited extrapolation, 2
[AD-A125877] N83-29583
Large-scale circuit simulation
[AD-A125941] N83-29607
Layout algorithms for the design of very large scale integrated circuits using partitioning
[BMFT-FB-T-83-018] N83-29620
Vibration in planetary gear systems with unequal planet stiffnesses
[NASA-TM-83428] N83-29709
Remote sensing of surface propagation parameters: Application of imagery simulation model results
[AD-A125513] N83-29785
Matching edges in maps and aerial images using the chamfer matching algorithm
[FOA-C-30315-E1] N83-29791
Automatic detection of loops in leveling networks
[PB83-154641] N83-29801
Automatic recognition of mesocyclones from single Doppler radar data
[AD-A125854] N83-29929
Image processing and digitization facility
[AD-A126307] N83-30074
Programs for solving polynomial equations
[PB83-167171] N83-30089
Initial Graphics Exchange Specification (IGES), version 2.0
[PB83-137448] N83-30092
User's instructions for the SHORTZ and LONGZ computer programs, volume 2
[PB83-146092] N83-30094
Distributed decision making environment
[AD-A126021] N83-30099
Flux-based acceleration of the Euler equations
[NASA-TM-83453] N83-30113
Multi-gold algorithms with applications to elliptic boundary-value problems
[AD-A125769] N83-30114
A minimal technology routing system
[AD-A126079] N83-30122
The structure of divide and conquer algorithms
[AD-A126086] N83-30124
Spacefilling curves and routing problems in the plane
[AD-A126309] N83-30125
High-performance banded equation solver for the CRAY-1. Part 2: The symmetric case
[AD-A125560] N83-30127
Representation of multivariate functions
[AD-A125898] N83-30132
Locally one dimensional numerical methods for multi-dimensional free surface problems
[AD-A125902] N83-30133
Survey of some results from the theory of stochastic approximations with a view to system identification
[PB83-161943] N83-30142
Confidence envelopes for monotonic functions: Principles, derivations, and examples
[AD-A126230] N83-30151
An O(/E/) time algorithm for computing the reliability of a class of directed networks
[PB83-167197] N83-30159
Electron-impact ionization: Time-dependent and other numerical approaches
[DE82-017517] N83-30198
Methods for two-dimensional charged-particle transport in collisionless plasmas
[DE82-014044] N83-30245
Investigation of the neutron production phases of a large plasma focus device
[IPF-82-12] N83-30262

ALKALI HALIDES
Search for far infrared radiation from optically pumped defect modes
[AD-A125940] N83-29685

ALKALINE BATTERIES
Polyvinyl alcohol battery separator containing inert filler
[NASA-CASE-LEW-13556-2] N83-29805
ALLOCATIONS
Efficient tree handling procedures for allocation/processing networks
[AD-A126238] N83-30156
ALLOTROPY
Structures and polarized electronic absorption spectra of dimolybdenum tetraformate crystals
[DE83-004863] N83-30281
ALLOYS
SEM (Scanning-Electron-Microscopy) studies of magnetic domains in amorphous metals
[AD-A126070] N83-29365
Silicon carbide alloys
[AD-A125968] N83-29398
ALPHA DECAY
Determination of the Alpha parameter for the decay of xi minus into Lambda pi minus
[PB83-164814] N83-30209
ALPHA PARTICLES
Solar and interplanetary ions near Earth N83-29891
ALTITUDE
Modeling of the Mode S tracking system in support of aircraft safety research
[NASA-CR-166486] N83-29186
OPTIM: Computer program to generate a vertical profile which minimizes aircraft fuel burn or direct operating cost. User's guide
[NASA-CR-166061] N83-30061
ALTITUDE SICKNESS
Procedures for the measurement of acute mountain sickness
[AD-A126280] N83-29995
ALTITUDE SIMULATION
Pressure altitude tests of the Army AN/MSQ-114 control terminal
[AD-A125524] N83-29572
ALUMINUM ALLOYS
Effect of the test environment on creep crack growth rates for nickel base alloys. A study of creep crack growth in 2219-T851 aluminum alloy using a computerized testing system
[AD-A125698] N83-29361
ALUMINUM COMPOUNDS
Mechanical reliability of current alumina and beryllia ceramics used in microwave windows for gyrotrons
[DE83-006360] N83-29404
ALUMINUM GALLIUM ARSENIDES
Integrated optical transmitter and receiver
[AD-A125493] N83-29575
Permanent damage effects in Si and AlGaAs/GaAs photodiodes
[DE82-018292] N83-29866
ALUMINUM NITRIDES
Silicon carbide alloys
[AD-A125968] N83-29398
ALUMINUM OXIDES
Studies of dry-powder extinguishment of diffusion flames for condensed fuels
[PB83-150656] N83-29348
Line-sinter processing of anorthosite for the recovery of alumina
[PB83-148435] N83-29379
AMBIENT TEMPERATURE
Intermediate photovoltaic system application experiment operational performance report for G. N. Wilcox Memorial Hospital, Kauai, Hawaii for October 1982, volume 6
[DE83-006415] N83-29834
AMMONIA
Studies of the gas- and aqueous-phase composition of stratiform clouds
[DE83-005912] N83-29872
AMORPHOUS MATERIALS
SEM (Scanning-Electron-Microscopy) studies of magnetic domains in amorphous metals
[AD-A126070] N83-29365
AMPLIFICATION
A note on beamforming algorithms
[AD-A126275] N83-29564
AMPLITUDE DISTRIBUTION ANALYSIS
Microwave multipath from sea reflections: The Bay of Fundy N83-29500
Amplitude scintillation in propagation paths above 10 GHz N83-29508
AMPLITUDE MODULATION
Modification of a plasma-therm inductively coupled plasma supply to enable RF power modulation
[AD-A126232] N83-30237
AMPLITUDES
Amplitude and phase of surface pressure produced by space transportation system: Mission 5
[AD-A125846] N83-29300
ANALOG TO DIGITAL CONVERTERS
A FDM master-group signal encoding equipment
[AD-A126158] N83-29566
Image processing and digitization facility
[AD-A126307] N83-30074
ANALYSIS (MATHEMATICS)
Formation of universes in spaces of varying dimensionality
[PR-775] N83-30334
ANALYSIS OF VARIANCE
On the variance of probability estimates with correlated data
[AD-A126336] N83-30153
ANALYTIC FUNCTIONS
Multidimensional signal restoration and band-limited extrapolation, 2
[AD-A125877] N83-29583
ANEMOMETERS
The wedge hot-film anemometer in supersonic flow
[NASA-TP-2134] N83-30164
ANGULAR ACCELERATION
Effects of some motion sickness suppressants on tracking performance during angular accelerations
[AD-A123839] N83-29994
ANGULAR DISTRIBUTION
Portable 90 deg proof loading device
[NASA-CASE-MSC-20250-1] N83-29707
Wavelength scaling of the two-plasmon decay and stimulated Raman-scattering instabilities
[DE83-007905] N83-30202
ANGULAR MOMENTUM
Probing the nuclear structure with heavy-ion reactions
[DE82-017316] N83-30195
ANGULAR VELOCITY
Influence from coriolis and centripetal accelerations on in-service tire vibrations
[PB83-145185] N83-29469
ANISOTROPIC MEDIA
Effect of large-scale anisotropic refractive index inhomogeneities on the strength of the coherent VHF signal component beyond the horizon N83-29557
ANNEALING
Rapid annealing in advanced bipolar microcircuits
[DE82-018772] N83-29616
ANNIHILATION REACTIONS
Some prospects for antiproton physics
[DE82-011582] N83-30199
Survey of models of baryon production in e plus e minus annihilation
[PB83-166850] N83-30212
Focusing and imaging sharp line X-ray and gamma-ray sources using variable-metric diffraction crystals
[DE83-007789] N83-30285
ANNUAL VARIATIONS
Mean monthly, seasonal and annual pan evaporation for the United States
[PB83-161729] N83-29942
ANORTHOSITE
Line-sinter processing of anorthosite for the recovery of alumina
[PB83-148435] N83-29379
ANTARCTIC REGIONS
Japanese MAGSAT team
[E83-10366] N83-29777
East Antarctic ice sheet surface contours from satellite radar altimetry, a demonstration
[PB83-166397] N83-29796
ANTENNA ARRAYS
Symmetric four antenna array resolves multiple reflectors with complex spectrum analysis of multiplexed closely spaced frequency soundings N83-29555
A note on beamforming algorithms
[AD-A126275] N83-29564
Reactively steered adaptive array using microstrip patch elements at 4 gigahertz
[AD-A126298] N83-29570
Jam resistant communications systems techniques
[AD-A126217] N83-29579
ANTENNA RADIATION PATTERNS
On electromagnetic methods in geophysical probing N83-29547
A note on beamforming algorithms
[AD-A126275] N83-29564
ANTENNAS
Interactive analysis of a large aperture Earth observations satellite
[NASA-TM-85638] N83-29304
ANTIMATTER
Higgs mass scales and matter-anti-matter oscillations in grand unified theories
[DE82-017638] N83-30294
ANTINEUTRINOS
Limits on neutrino-antineutrino transitions from a study of high energy neutrino interactions
[PB83-165944] N83-30213
ANTIPROTONS
Some prospects for antiproton physics
[DE82-011582] N83-30199
ANTISEPTICS
Adequacy of disinfection for control of newly recognized waterborne pathogens
[PB83-152181] N83-29884
APERTURES
On the aperture illumination of multibeam satellite antennas
[FTZ-454-TBR-36] N83-29588
Use of a priori information for improved tomographic imaging in coded-aperture systems N83-30220
APEXES
An O(/E/) time algorithm for computing the reliability of a class of directed networks
[PB83-167197] N83-30159
APPROACH CONTROL
LORAN-C nonprecision approaches in the northeast corridor
[FAA-RD-82-78] N83-29192
APPROXIMATION
Finite area method for nonlinear supersonic conical flows
[NASA-CR-172148] N83-29177
Residential demand for energy. Volume 1: Residential energy demand in the US
[DE82-903277] N83-29818
Legendre-Tau approximations for functional differential equations
[NASA-CR-172155] N83-30108
Stability analysis of finite difference schemes for the advection-diffusion equation
[NASA-CR-172823] N83-30123
Representation of multivariate functions
[AD-A125898] N83-30132
Survey of some results from the theory of stochastic approximations with a view to system identification
[PB83-161943] N83-30142
AQUEOUS SOLUTIONS
An electrochemical rebalance cell for Redox systems
[NASA-TM-83363] N83-29326
AQUICULTURE
Advanced biological treatment of municipal wastewater through aquaculture
[PB83-159319] N83-29882
Monitoring biotransformation and biodegradation of xenobiotics in simulated aquatic microenvironmental systems
[PB83-153718] N83-29883
AQUIFERS
Organic geochemistry of deep ground waters — Washington state and Sweden
[DE83-005333] N83-29787
Ground water quality in southeastern Minnesota
[PB83-154377] N83-29800
Calculation of unsaturated hydraulic conductivity
[DE82-016325] N83-29876
ARCHITECTURE
Masonry structural design for buildings
[AD-A126314] N83-29452
Evaluation of the ORNL residential energy-use model
[DE82-905768] N83-29820
ARCHITECTURE (COMPUTERS)
International Workshop on High-level Language Computer Architecture
[AD-A126223] N83-30043
Local code generation and compaction in optimizing microcode compilers
[AD-A126026] N83-30076
A review of currently available high performance interactive graphic systems
[PB83-165951] N83-30091
Resource sharing in a network of personal computers
[AD-A126003] N83-30096
ARCTIC REGIONS
Arctic terrestrial environmental research programs of the Office of Energy Research, Department of Energy: Evaluation and recommendations
[DE82-018600] N83-29871
AREA NAVIGATION
LORAN-C nonprecision approaches in the northeast corridor
[FAA-RD-82-78] N83-29192
Development and evaluation of a Kalman-filter algorithm for terminal area navigation using sensors of moderate accuracy
[NASA-TP-2035] N83-29193
ARGON LASERS
Influence of prolonged illumination of the rabbit retina by monochromatic light on its functional state N83-29979
ARID LANDS
Soil temperature investigations using satellite acquired thermal-infrared data in semi-arid regions — Utah
[E83-10355] N83-29753

ARIZONA
Solar energy system performance evaluation. Scottsdale Courthouse, Scottsdale, Arizona, March, April, July, August, and October 1981 through February 1982
[DE82-019030] N83-29854
ARMED FORCES (UNITED STATES)
Department of the Air Force supporting data for fiscal year 1984 budget estimates submitted to Congress, January 31, 1983. Descriptive summaries, research, development, test and evaluation
[AD-A125932] N83-30301
Integration of new technology in Army libraries, appendices
[AD-A125984] N83-30308
AROMATIC COMPOUNDS
Molecular biology of environmental aromatic hydrocarbons
[DE82-016978] N83-29875
ARRAYS
Local defect arrays and properties of oxides
[AD-A125927] N83-29368
Restructurable VLSI program
[AD-A126216] N83-29611
ARRHYTHMIA
Effect of cordiamine and mesatone on ECG under conditions of acute microwave irradiation N83-29977
ARSENIC COMPOUNDS
Metal coordination chemistry: Removal and recovery of metal compounds from heavy crude and shale oils with multidentate ligands
[DE83-006912] N83-29343
ARTERIOSCLEROSIS
Ultrasonic imaging development
[PB83-155994] N83-30007
ARTIFICIAL INTELLIGENCE
Competitive argumentation in computational theories at cognition
[AD-A125577] N83-30009
Advanced tools for software maintenance
[AD-A126146] N83-30071
Generating natural language explanations in a computer-aided design system
[AD-A126190] N83-30079
Distributed decision making environment
[AD-A126021] N83-30099
The 3 papers on rule-based estimation of statistics on databases
[AD-A126196] N83-30310
ASPHALT
Latex improvement of recycled asphalt pavement
[PB83-152694] N83-29460
ASSESSMENTS
Geothermal-reservoir assessment and confirmation program for direct-heat applications in Colorado
[DE83-009816] N83-29836
ASTRONOMICAL MODELS
Formation of universes in spaces of varying dimensionality
[PR-775] N83-30334
Phenomenological model of the nucleus of the galaxy
[PR-728] N83-30335
ASTROPHYSICS
High Energy Astrophysics Laboratory Contributions to the 18th International Cosmic Ray Conference
[NASA-TM-85034] N83-30351
ASYMPTOTIC METHODS
A recursive estimator and stability of a class of time varying difference equations
[PB83-167213] N83-30138
Higher order asymptotics for simple linear rank statistics
[MATH-CENTRE-TRACTS-151] N83-30147
ATLANTIC OCEAN
The long term upper ocean study (LOTUS) cruise summary and hydrographic data report OCEANUS 119, May 1982
[AD-A125737] N83-29956
A numerical model for wind-wave prediction in deep water
[AD-A125985] N83-29957
ATMOSPHERIC ATTENUATION
Statistics of radio refractivity and atmospheric attenuation in tropical climates — Africa N83-29505
Results obtained from attenuation measurements of the Deutsche Bundespost OTS propagation experiment N83-29510
Attenuation by rain on Earth-space paths at 13 GHz N83-29512
Theoretical and experimental investigation of propagation attenuation by equatorial and tropical precipitation N83-29519
Rain rate profile effects on radiowave attenuation above 10 GHz N83-29520
One-hundred GHz open-resonator measurements of artificial precipitation and fog propagation parameters N83-29522
Radiative transfer in size-limited bodies — rain attenuation N83-29544
Experimental and analytical aspects of atmospheric EHF refractivity N83-29556
ATMOSPHERIC BOUNDARY LAYER
Radiometric sensing of the atmospheric boundary layer N83-29533
ATMOSPHERIC CHEMISTRY
Studies of the gas- and aqueous-phase composition of stratiform clouds
[DE83-005912] N83-29872
Spectroscopic properties of metal monoxides and hydroxides important in the ionosphere
[AD-A126332] N83-29905
ATMOSPHERIC CIRCULATION
Mechanisms of stratospheric ozone transport N83-29892
The 1980 stratospheric-tropospheric exchange experiment
[NASA-TM-84297] N83-29924
A low-order model of a moist general circulation: Formulation and testing
[AD-A126331] N83-29953
ATMOSPHERIC COMPOSITION
Atmospheric environment for Space Shuttle (STS-6) launch
[NASA-TM-82529] N83-29926
Reconstruction of the H2O profile from the results of modeling the heat flux in the lower atmosphere of Venus
[NASA-TM-77216] N83-30343
ATMOSPHERIC DIFFUSION
UV emissions and the electron density in the auroral and low to mid-latitude daytime ionospheres
[AD-A126318] N83-29901
ATMOSPHERIC EFFECTS
Effects of the atmosphere on image resolution in microwave radiometry N83-29530
Propagation characteristics at 35 and 78 GHz for spaceborne altimeters N83-29546
ATMOSPHERIC ENTRY
Predictions of entry heating for lower surface of shuttle orbiter
[NASA-TM-84624] N83-29631
ATMOSPHERIC MODELS
Scattering and absorption by atmospheric aerosol models N83-29542
Backscattering and differential backscattering characteristics of the melting layer — of the atmosphere N83-29543
Mechanisms of stratospheric ozone transport N83-29892
Investigate and develop mathematical formulas in support of atmospheric studies
[AD-A125869] N83-29897
Cape Canaveral, Florida range reference atmosphere 0-70 km altitude
[NASA-TM-85253] N83-29935
Formulation of a prototype coupled atmospheric and oceanic boundary layer model
[AD-A126000] N83-29951
A low-order model of a moist general circulation: Formulation and testing
[AD-A126331] N83-29953
ATMOSPHERIC MOISTURE
Mesospheric water vapor measured with an airborne sensor N83-29531
Geodetic distance measuring apparatus
[NASA-CASE-GSC-12809-2] N83-29681
On the joint bimodality of temperature and moisture near stratocumulus cloud tops
[NASA-TM-85008] N83-29927
A low-order model of a moist general circulation: Formulation and testing
[AD-A126331] N83-29953
ATMOSPHERIC PHYSICS
Interactions Measurements Payload for Shuttle (IMPS)
[AD-A125841] N83-29299
Investigate and develop mathematical formulas in support of atmospheric studies
[AD-A125869] N83-29897
ATMOSPHERIC PRESSURE
Cape Canaveral, Florida range reference atmosphere 0-70 km altitude
[NASA-TM-85253] N83-29935
ATMOSPHERIC REFRACTION
Scattering and absorption by atmospheric aerosol models N83-29542
Experimental and analytical aspects of atmospheric EHF refractivity N83-29556
ATMOSPHERIC SCATTERING
Radiative transfer in size-limited bodies — rain attenuation N83-29544
Multiple scattering effects on transmission through the atmosphere
[AD-A126010] N83-30226
Single and multiple scattered solar radiation
[AD-A126323] N83-30349
ATMOSPHERIC STRATIFICATION
Upper tropospheric structures observed with VHF radar at Arecibo N83-29507
ATMOSPHERIC TEMPERATURE
Backscattering and differential backscattering characteristics of the melting layer — of the atmosphere N83-29543
On the joint bimodality of temperature and moisture near stratocumulus cloud tops
[NASA-TM-85008] N83-29927
ATMOSPHERIC TURBULENCE
A comparison of radio wave and in situ observations of tropospheric turbulence and wind velocity N83-29506
ATOMIC BEAMS
High-resolution laser and rf spectroscopy of atomic and molecular beams
[DE83-008942] N83-29699
ATOMIC CLOCKS
Phase 2B prototype redesign, tactical rubidium frequency standard
[AD-A126320] N83-29658
ATOMIC COLLISIONS
Electron-impact ionization: Time-dependent and other numerical approaches
[DE82-017517] N83-30198
ATOMIC ENERGY LEVELS
Actionometry in monochromatic flash photolysis: The extinction coefficient of triplet benzophenone and quantum yield of triplet zinc tetraphenyl porphyrin
[DE83-006819] N83-29345
Multiphoton ionization and third-harmonic generation in atoms and molecules
[DE82-015748] N83-30185
ATOMIC EXCITATIONS
Electron-impact ionization: Time-dependent and other numerical approaches
[DE82-017517] N83-30198
ATOMIC STRUCTURE
Spectroscopic studies of the electronic structure of metal-semiconductor and vacuum-semiconductor interfaces
[AD-A125621] N83-30272
Devil's staircase and order without periodicity in classical condensed matter
[DE82-015744] N83-30283
ATOMIZERS
Design and development of a disc-windmill atomizer for aerial applications
[AE-8223] N83-29449
Atomizers for the aerial application of herbicides: Ideal and available
[CA-8207] N83-29632
ATOMS
Quantum dynamical model for laser excitation of a two-level adatom: Surface-dressed Bloch equations
[AD-A126201] N83-29696
ATTITUDE (INCLINATION)
Optical orientation in space N83-29282
AUDIO EQUIPMENT
Foreign technology alert-bibliography: Photography and recording devices. Citations from the NTIS data base
[PB83-101626] N83-29676
AUDIO FREQUENCIES
Data transmission systems
[AD-A126168] N83-29584
AUDITORY PERCEPTION
The event related brain potential as an index of information processing, cognitive activity, and skill acquisition: A program of basic research
[AD-A125699] N83-29999
AUGER SPECTROSCOPY
Oxygen diffusion of anodic surface oxide film on titanium studied by Auger electron spectroscopy
[DE82-013653] N83-29340
Oxygen and titanium sputtering yields as determined by laser fluorescence and Auger electron spectroscopy for monolayer oxygen coverage of polycrystalline Ti
[DE83-007683] N83-29373
AURORAL ZONES
Interactions Measurements Payload for Shuttle (IMPS)
[AD-A125841] N83-29299
AURORAS
Coordinated ground-based measurements at Chatanika: Auroral spatial and temporal structures
[AD-A126113] N83-29900
Geophysical plasmas and atmospheric modeling
[AD-A126341] N83-29904
AUTOMATA THEORY
On language families generated by commutative languages
[ISSN-0355-0087] N83-30051

AUTOMATIC CONTROL
Flight test experience on military aircraft engine handling N83-29248
Proceedings of the IFAC Symposium on Theory and Application of Digital Control. Volume 1: Discussion papers
[PB83-163923] N83-29677
Proceedings of the IFAC Symposium on Theory and Application of Digital Control. Volume 2: Discussion papers
[PB83-163931] N83-29678
Time scales, coherency, and weak coupling
[AD-A125845] N83-30118
AUTOMATIC FLIGHT CONTROL
Development and evaluation of a Kalman-filter algorithm for terminal area navigation using sensors of moderate accuracy
[NASA-TP-2035] N83-29193
AUTOMATIC PILOTS
Design, implementation and flight testing of PIF autopilots for general aviation aircraft
[NASA-CR-3709] N83-29270
AUTOMATION
Automatic recognition of mesocyclones from single Doppler radar data
[AD-A125854] N83-29929
Integration of new technology in Army libraries, appendices
[AD-A125984] N83-30308
AUTOMOBILE ENGINES
Development of ceramic automobile turbine engine components
[BMFT-FB-T-83-025] N83-29407
Development of high-temperature resistant, noncorrosible, nonmetallic ceramic materials, especially silicon nitride, for heat exchangers in gas turbine application
[BMFT-FB-T-83-026] N83-29408
AUTOMOBILE FUELS
Evaluation of fuel additives for reduction of material incompatibilities in methanol-gasoline blends
[NASA-CR-168061] N83-29359
Methanol as an alternate transportation fuel
[GPO-12-626] N83-29412
Alternative fuel technology series. Volume 1: Alternative fuels for transport
[ISBN-0-902937-63-4] N83-29414
Increased automobile fuel efficiency and synthetic fuels. Alternatives for reducing oil imports. Background paper number 3: Environmental issues of synthetic transportation fuels from coal
[PB83-161851] N83-29439
Increased automobile fuel efficiency and synthetic fuels: Alternatives for reducing oil imports. Background Paper Number 4: Environmental issues of synthetic transportation fuels from coal
[PB83-161919] N83-29440
Operating experience with a liquid-hydrogen fueled Buick and refueling system
[DE82-008113] N83-29716
Analysis of in-use fuel economy data, stage 1
[PB83-144162] N83-29721
AUTOMOBILES
Summary of status of Environmental Protection Agency (EPA), Office of Mobile Sources Characterization Projects as of March, 1982
[PB83-163972] N83-29441
Distortions in FM car radios caused by multipath reception and their reduction by means of antenna diversity N83-29502
A composite-flywheel burst-containment study
[DE82-014138] N83-29865
AUTOMORPHISMS
A finite flag-transitive geometry of extended G2-type
[MC-ZW-176/82] N83-30141
AUTOREGRESSIVE PROCESSES
The effect of environmental change in single-subject experiments
[AD-A125779] N83-30150
AUXILIARY POWER SOURCES
Experience with the KHD APU T312 for a modern fighter type N83-29251
AVAILABILITY
Platinum availability - market economy countries: A minerals availability system appraisal
[PB83-156869] N83-29385
AVALANCHE DIODES
A system for measuring energy and peak power of low-level 1.064 micrometer laser pulses
[PB83-165027] N83-29703
AVIONICS
USAF (United States Air Force) avionics master plan
[AD-A125819] N83-29205
Phase 2B prototype redesign, tactical rubidium frequency standard
[AD-A126320] N83-29658
Fiber optics in aircraft applications
[AD-A126165] N83-30230
AXES OF ROTATION
Centrifugal-reciprocating compressor
[NASA-CASE-NPO-14597-2] N83-29708
Display-control compatibility in 3-D displays. 2: Effects of cue symmetry
[AD-A125806] N83-30036
AXIAL COMPRESSION LOADS
Simple strength tests on and hydraulic fracturing of rock material
[PB83-165514] N83-29918
AXIAL FLOW
Axial compressor characteristics during transients N83-29259
Flow in a partially filled rotating cylinder N83-29626
Flow in a partially filled rotating cylinder --- as applied to gas centrifuges utilized for isotope separation
[DE82-018309] N83-29644
AXIAL STRESS
PRESS: A computer program for evaluating explosive-material loading processes
[DE82-015256] N83-29427
AZIMUTH
Modeling of the Mode S tracking system in support of aircraft safety research
[NASA-CR-166486] N83-29186

B

BACKSCATTERING
Numerical calculations of space-harmonic and full-wave scattering models N83-29534
Backscattering and differential backscattering characteristics of the melting layer --- of the atmosphere N83-29543
Wavelength scaling of the two-plasmon decay and stimulated Raman-scattering instabilities
[DE83-007905] N83-30202
BACTERIA
Water-hyacinth production primary and advanced treatment of wastewater
[DE83-006033] N83-29880
Adequacy of disinfection for control of newly recognized waterborne pathogens
[PB83-152181] N83-29884
BALL BEARINGS
Theoretical results for starved elliptical contacts
[NASA-TM-81697] N83-29710
BALLISTICS
Experimental aerodynamic facilities of the Aerodynamics Research and Concepts Assistance Section
[AD-A126272] N83-29274
BALLOONS
Accuracy, reproducibility and vertical resolution of data from radiosondes
[NASA-TM-76949] N83-29925
BANDPASS FILTERS
Investigations of other operating points for the RCA streak tube in the Lawrence Livermore National Laboratory streak camera
[DE82-019065] N83-29663
BARIUM ISOTOPES
Electronic isotope shifts muonic atoms and electron scattering
[DE82-014040] N83-30194
BARIUM TITANATES
Ferroelectric thin films for imaging and signaling techniques
[BMFT-FB-T-83-015] N83-30287
BAROCLINITY
Frictional secondary circulation near an upwelled thermocline
[PB83-162024] N83-29965
BARS
Satellite retrieval system
[NASA-CASE-MFS-25403-1] N83-29303
BARYONS
Survey of models of baryon production in e plus e minus annihilation
[PB83-166850] N83-30212
BATHYMETERS
Water penetration photogrammetry. Volume 1: Feasibility and evaluation study
[AD-A126209] N83-29291
The use of synthetic aperture radar to detect and chart submerged navigation hazards
[AD-A126071] N83-29567
Solid-state lasers for bathymetry and communications. Studies of four rare-earth materials
[AD-A126098] N83-29683
BATHYTHERMOGRAPHS
The long term upper ocean study (LOTUS) cruise summary and hydrographic data report OCEANUS 119, May 1982
[AD-A125737] N83-29956
BEADS
Process parameter effects on arc physics and heat flow in GTAW
[DE82-017269] N83-29717
BEAM INJECTION
Neutral-particle-beam production and injection
[DE83-006966] N83-30201
Neutral beam heating in stellarators: A numerical approach
[DE83-010458] N83-30242
BEAM NEUTRALIZATION
Density and potential measurements in an intense ion-beam-generated plasma
[DE82-018803] N83-30248
BEAM SPLITTERS
Performance of laser beam wavefront sensor
[AD-A125432] N83-29691
BEAMS (RADIATION)
Grating beam combiner
[AD-A125456] N83-29692
Beam-profile measurement of laser pulses using a spatial filter to sample the hermite modes for a string of pulses
[PB83-156612] N83-29702
BEARING (DIRECTION)
Display-control compatibility in 3-D displays. 2: Effects of cue symmetry
[AD-A125806] N83-30036
BEARINGS
Portable 90 deg proof loading device
[NASA-CASE-MSC-20250-1] N83-29707
Elastomeric bearings design, construction and materials
[PB83-149211] N83-29723
BEDS (PROCESS ENGINEERING)
Relative catalytic activity of iron containing minerals for the hydrogasification of coal
[DE82-012776] N83-29337
BENZENE
Actinometry in monochromatic flash photolysis: The extinction coefficient of triplet benzophenone and quantum yield of triplet zinc tetraphenyl porphyrin
[DE83-006819] N83-29345
BERYLLIUM COMPOUNDS
Mechanical reliability of current alumina and beryllia ceramics used in microwave windows for gyrotrons
[DE83-006360] N83-29404
BESSEL FUNCTIONS
Dynamic-pressure measurements using an electronically scanned pressure module
[NASA-TM-84650] N83-29655
Tables of spherical Bessel functions of the first and second kinds for complex arguments
[AD-A125876] N83-30130
BETA FACTOR
Confinement and heating of high-beta plasmas with emphasis on compact toroids. Task 2: High-beta Q-machine experiment
[DE82-020341] N83-30239
Beta increase in a belt pinch plasma by fast magnetosonic wave heating
[IPF-82-11] N83-30261
BETA PARTICLES
Los Alamos portable beta-ray spectrometer
[DE83-007575] N83-29667
Application of adjusted data in calculating fission-product decay energies and spectra
[DE82-019182] N83-30193
BIBLIOGRAPHIES
LC Science Tracer Bullet: Jet engines and jet aircraft
[TB-82-5] N83-29207
Magnetic suspension and balance systems, a selected, annotated bibliography
[NASA-TM-84661] N83-29273
Foreign technology alert-bibliography: Ceramics, refractories and glass technology
[PB83-101642] N83-29323
Foreign technology alert-bibliography: Photography and recording devices. Citations from the NTIS data base
[PB83-101626] N83-29676
Bibliography of Soviet laser developments, no. 55, September - October 1981
[AD-A126022] N83-29686
Reports on crustal movements and deformations --- bibliography
[NASA-TM-85041] N83-29894
Aerospace medicine and biology: A continuing bibliography with indexes (supplement 247)
[NASA-SP-7011(247)] N83-29989

Publications of the exobiology program for 1982. A special bibliography
[NASA-TM-85837] N83-30041
Multiple scattering effects on transmission through the atmosphere
[AD-A126010] N83-30226
Scientific and technical information output of the Langley Research Center for calendar year 1982
[NASA-TM-84615] N83-30306
Studies of scientific disciplines: An annotated bibliography
[PB83-159954] N83-30319

BIFURCATION (BIOLOGY)
Ultrasonic imaging development
[PB83-155994] N83-30007

BINARY STARS
Globular clusters and X-ray bursters
[PR-764] N83-30333
Phenomenological model of the nucleus of the galaxy
[PR-726] N83-30335

BINDERS (MATERIALS)
Sensitivity characterization of low vulnerability (LOVA) propellants
[AD-A126130] N83-29415

BIOASSAY
Identification and comparative genotoxicity of polycyclic aromatic hydrocarbons and related nitrogen-containing heteroatomic species in products from coal liquefaction processes
[DE83-006939] N83-29312

BIOCHEMISTRY
Molecular biology of environmental aromatic hydrocarbons
[DE82-016978] N83-29875

BIOCONVERSION
Low-energy process to extract anhydrous ethanol from fermentation beers
[DE83-005012] N83-29419
Development of a process to produce alcohol at paper mills
[DE83-009668] N83-29422
Marine Biomass Program: Kelp biomass program summary
[PB83-167247] N83-29438

BIODEGRADATION
Response of combined electrical stimulation and biodegradable ceramics
[AD-A126300] N83-29401
Microbial degradation of oil: Research and development 1982, TOBOS 85 program --- techniques for oil combat and clean-up (TOBOS 85)
[FOA-C-40167-B4] N83-29881
A perspective on the role of microcosms in environmental fate and effects assessments
[PB83-165530] N83-29889

BIODYNAMICS
Investigation of crew restraint system biomechanics
[AD-A126199] N83-29190
Response of combined electrical stimulation and biodegradable ceramics
[AD-A126300] N83-29401
Mechanical properties of the spinal ligaments of primates. Part 1: Cyclic loading. Part 2: Mathematical modeling
[AD-A125540] N83-29968
Some vibration data on primates implanted with accelerometers on the upper and lower spine: Methodology and results in Rhesus monkeys
[AD-A125545] N83-29969
Biomechanics of head tolerance criteria --- impact injuries
[NPL-DMA(A)64] N83-29990

BIOENGINEERING
Biotechnology: The forging of multidisciplinary strategies for research in biomolecular electronics, materials sciences and microecology
[AD-A125799] N83-29967

BIOGEOCHEMISTRY
Land-related global habitability science issues
[NASA-TM-85841] N83-29744

BIOLOGICAL EFFECTS
Identification and comparative genotoxicity of polycyclic aromatic hydrocarbons and related nitrogen-containing heteroatomic species in products from coal liquefaction processes
[DE83-006939] N83-29312
Atomizers for the aerial application of herbicides: Ideal and available
[CA-8207] N83-29632
Problems of studying the biological effect of electromagnetic fields discussed N83-29976
Local use of microwave electromagnetic energy on biologically active points N83-29978
Dependence of biological effects of microwave irradiation on exposure intensity and duration N83-29980
Metabolism of the brain and liver after experimental exposure to super high-frequency fields of non-thermal intensity N83-29981
Use of magnets in medical treatment N83-29986
Aerospace medicine and biology: A continuing bibliography with indexes (supplement 247)
[NASA-SP-7011(247)] N83-29989

BIOLOGICAL EVOLUTION
Publications of the exobiology program for 1982. A special bibliography
[NASA-TM-85837] N83-30041

BIOMASS
Progress in studies on catalyzed gasification of wood
[DE83-009124] N83-29332
Countercurrent reverse osmosis for ethanol-water separation
[DE83-009725] N83-29333
Remote sensing investigations of wetland biomass and productivity for global biosystems research N83-29767
SERI Biomass Program
[DE83-009763] N83-29845
Monitoring biotransformation and biodegradation of xenobiotics in simulated aquatic microenvironmental systems
[PB83-153718] N83-29883

BIOMASS ENERGY PRODUCTION
Hydropyrolysis of biomass to produce liquid hydrocarbon fuels
[DE83-009985] N83-29420
Formation of aromatic and possible oligomeric materials from cellulose liquefaction
[DE83-005558] N83-29432
Marine Biomass Program: Kelp biomass program summary
[PB83-167247] N83-29438

BIOSYNTHESIS
Continuous production of ethanol and chemical byproducts
[DE83-009667] N83-29421

BLANKETS (FUSION REACTORS)
Preliminary conceptual design study of a suppressed-fission Tokamak hybrid
[DE83-008428] N83-30255

BLASIUS EQUATION
Nonuniqueness in wakes and boundary layers
[UTRC83-15] N83-29630

BLOOD
Domestic swine in physiological research. Part 4: A blood acid-base curve nomogram for immature pigs
[AD-A126081] N83-29971
Action of industrial frequency electric field on indicators of natural immunity N83-29984

BLOOD CIRCULATION
State of hepatic circulation in response to combined effect of lead and electromagnetic fields N83-29982

BLOOD VESSELS
Non-invasive method and apparatus for measuring pressure within a pliable vessel
[NASA-CASE-ARC-11264-2] N83-29991

BODIES OF REVOLUTION
Calculation of three-dimensional boundary layers on bodies at incidence
[AD-A125634] N83-29637

BODY-WING CONFIGURATIONS
A numerical study of Strake aerodynamics
[AD-A125882] N83-29182

BOILERS
Commercial scale coal test. Volume 4: Coal fines utilization in furnace boilers
[DE83-007450] N83-29433
Carbon granule probe microphone for leak detection
[NASA-CASE-NPO-16027-1] N83-29595
Optical probe for steam-generator-tube dent measurement
[DE83-901484] N83-29668
Conceptual design of a direct-contact natural-gas-fired downhole steam generator
[DE82-019875] N83-29851
Downhole steam-generator study. Volume 2: Design summary
[DE82-019824] N83-29852

BOLTS
Securable bearing stress-strain indicator --- for monitoring torque on bolts incorporated in pressure vessels
[NASA-CASE-LAR-12774-1] N83-29654

BOLTZMANN TRANSPORT EQUATION
Confinement and heating of high-beta plasmas with emphasis on compact toroids. Task 2: High-beta Q-machine experiment
[DE82-020341] N83-30239
Semiconductor materials for high frequency solid state sources
[AD-A126242] N83-30276

BONDING
SEM/TEM fractography of composite materials
[AD-A125832] N83-29317
CO + H sub 2 reactions over nitrogen-modified iron catalysts
[DE83-006579] N83-29335

BONES
Response of combined electrical stimulation and biodegradable ceramics
[AD-A126300] N83-29401

BOOMS (EQUIPMENT)
Extended moment arm anti-spin device
[NASA-CASE-LAR-12979-1] N83-29173

BOREHOLES
Executive committee report: Geotechnical instrumentation working group meeting
[DE82-012837] N83-29664
Cross-borehole fracture mapping using electromagnetic geotomography
[DE82-012699] N83-29910
Simple strength tests on and hydraulic fracturing of rock material
[PB83-165514] N83-29918
Analysis of the internal point load test
[PB83-164566] N83-29919

BORN APPROXIMATION
Relations between the simultaneous and sequential transfer of 2 nucleons
[DE82-017425] N83-30190

BORON
The characterization and performance of thirteen boron/calcium chromate pyrotechnic blends, 2
[DE82-014693] N83-29430

BOROSILICATE GLASS
Commercial high-level-waste management: Options and economics. A comparative analysis of the ceramic and glass waste forms
[DE83-006235] N83-30218

BOSONS
Higgs mass scales and matter-anti-matter oscillations in grand unified theories
[DE82-017638] N83-30294

BOUNDARIES
Structure and dynamics of Saturn's outer magnetosphere and boundary regions
[NASA-TM-85065] N83-30346

BOUNDARY LAYER FLOW
Nonuniqueness in wakes and boundary layers
[UTRC83-15] N83-29630
Calculation of three-dimensional boundary layers on bodies at incidence
[AD-A125634] N83-29637
The drag of a circular cylinder on or near a flat plat appropriate for ship-model turbulence stimulators
[AD-A126155] N83-29638

BOUNDARY LAYER SEPARATION
A look at engine handling aspects from aircraft flight test experience; with an outlook for future requirements N83-29245

BOUNDARY LAYER TRANSITION
The drag of a circular cylinder on or near a flat plat appropriate for ship-model turbulence stimulators
[AD-A126155] N83-29638

BOUNDARY LAYERS
Axial compressor middle stage secondary flow study
[NASA-CR-3701] N83-29174
Numerical simulation for droplet combustion using Lagrangian hydrodynamics N83-29210
Studies of dry-powder extinguishment of diffusion flames for condensed fuels
[PB83-150656] N83-29348

BOUNDARY LUBRICATION
Theoretical results for starved elliptical contacts
[NASA-TM-81697] N83-29710

BOUNDARY VALUE PROBLEMS
Application of the theory of boundary value problems in the analysis of a queueing modeling with paired services
[MATH-CENTRE-TRACTS-153] N83-30105
Multi-gold algorithms with applications to elliptic boundary-value problems
[AD-A125769] N83-30114
A saddle value characterization of Fan's equilibrium points
[AD-A126237] N83-30120
Locally one dimensional numerical methods for multi-dimensional free surface problems
[AD-A125902] N83-30133

BRAIN
Metabolism of the brain and liver after experimental exposure to super high-frequency fields of non-thermal intensity N83-29981
The event related brain potential as an index of information processing, cognitive activity, and skill acquisition: A program of basic research
[AD-A125699] N83-29999

Facility for in-vivo measurement of lithium
[DE83-007388] N83-30006
Brain responses and information processing 3: Hemispheric asymmetry in event related potentials and performance during discrimination of line orientation and velocity of motion
[AD-A125681] N83-30011

BRAIN DAMAGE
An engineering assessment of head tolerance criteria
[NPL-DMA(A)63] N83-30015

BRAKING
A composite-flywheel burst-containment study
[DE82-014138] N83-29865

BRANCHING (MATHEMATICS)
Quasi periodicity in local bifurcation theory
[PB83-165092] N83-30144

BREAKWATERS
Tidal inlet response to jetty construction
[AD-A112448] N83-29950

BREEDER REACTORS
Preliminary conceptual design study of a suppressed-fission Tokamak hybrid
[DE83-008428] N83-30255

BREMSSTRAHLUNG
Studying electron distributions using the time-resolved free-bound spectra from coronal plasmas
[DE83-006569] N83-30241
Self-consistent electron transport in collisional plasmas
[DE82-014083] N83-30244

BRIGHTNESS TEMPERATURE
Influence of surface type on the brightness temperature of snow-covered terrain --- satellite observation
N83-29532

BRILLOUIN EFFECT
Optical-scattering measurements from 1.06-micron, 0.53-micron, and 0.35-micron laser-heated disk targets
[DE82-015418] N83-30232

BRINES
Hydrodynamic/kinetic reactions in liquid-dominated geothermal systems
[DE82-017287] N83-29814
Heat and mass extraction from solar ponds: Analysis and development of a laboratory facility
[DE82-013888] N83-29856

BRITISH COLUMBIA
Analysis of multipath fading observations on certain microwave paths in British Columbia N83-29498

BRITTLENESS
SEM/TEM fractography of composite materials
[AD-A125832] N83-29317
Elastomer toughened polyimide adhesives
[NASA-LAR-12775-2] N83-29390
Advanced seismological research and improved yield determination
[AD-A125508] N83-29903

BROADBAND
Third order polarization for multifrequency coherent anti-Stokes Raman scattering
[AD-A125434] N83-29330
The PACEM experiment on line of sight multipath propagation --- propagation in clear air and meteorology (PACEM) N83-29499

BROADCASTING
Capabilities, limitations, and use of BC SAT-R2 conference software
[NASA-TM-83383] N83-29493
Multiaccess of a slotted channel using a control mini-slot
[AD-A125569UVA-525634/EE82/106] N83-29562

BROMINE
Flowing-electrolyte-battery testing and evaluation
[DE82-015258] N83-29861

BUBBLES
Adverse pressure gradient corner flows
[AD-A126059] N83-29639

BUDGETING
Space science research in the US: A technical memorandum
[PB83-166512] N83-30303

BUILDINGS
Masonry structural design for buildings
[AD-A126314] N83-29452
Analysis of roof snow load case studies: Uniform loads
[AD-A126330] N83-29455
An evaluation of the design and analytical seismic response of a seven-story reinforced concrete frame-wall structure
[PB83-157628] N83-29470
Solar storage for process heat and building application: A review of prior assessments
[DE82-019791] N83-29857

BUOYS
Further development of Kospas-Salyut system
N83-29287

BURNERS
Coupling of transport and chemical processes in catalytic combustion N83-29230
Industrial burner and process efficiency program
[PB83-161059] N83-29482

BURNING RATE
Pyrotechnic deflagration velocity and permeability
[DE82-014100] N83-29428

BURSTS
Globular clusters and X-ray bursters
[PR-764] N83-30333

BUTYRIC ACID
Production of butanol by fermentation in the presence of co-culture of clostridium
[NASA-CASE-NPO-16203-1] N83-29806

C

CADMIUM
Removal of hydrogen from plated high strength steel by baking: A statistically designed study
[AD-A126100] N83-29366

CADMIUM TELLURIDES
Effects of surface preparation on the properties of single crystal CdTe junctions N83-30266

CALCIUM
The characterization and performance of thirteen boron/calcium chromate pyrotechnic blends, 2
[DE82-014693] N83-29430
A theoretical analysis of the observed calcium anomalies concomitant with the interaction of low intensity electric fields with cerebral tissue
[AD-A126284] N83-29996

CALCIUM OXIDES
Influence of selected additives and CaO:SiO2 ratio on high-temperature strength of MgO refractories
[PB83-157875] N83-29410

CALIBRATING
First global results of the European Space Agency OTS propagation campaign N83-29511
Evaluation of an effective medium temperature from radiometric-satellite beacons comparisons N83-29526
Testing to quantify the effects of handling of gas dielectric standard capacitors
[PB83-149385] N83-29624
Selection and calibration of pressure transducers for low pressure measurement (0.001 psia) in the tunnel 9 high altitude side force test (WTR 1365)
[AD-A125475] N83-29657
Definition of standards and methods of calibrating for Imaging Microwave Radiometers (IMR)
[ESA-CR(P)-1724] N83-29671
Radiation standards and calibrations
[DE82-019748] N83-30200

CALORIMETERS
Development of the cone calorimeter, a bench scale heat release rate apparatus based on oxygen consumption
[PB83-151266] N83-29673

CAMERAS
Design analysis and performance evaluation of a two-dimensional camera for accelerated positron-emitter beam injection by computer simulation
[DE83-005866] N83-29661
Automatic focussing devices for photographic cameras
[PB83-155275] N83-29674

CANOPIES (VEGETATION)
Remote sensing investigations of wetland biomass and productivity for global biosystems research N83-29767

CANS
Incorporation of high level wastes in SYNROC: Results from recent process engineering studies at Lawrence Livermore National Laboratory
[DE82-013402] N83-30214

CANTILEVER BEAMS
Effects of variation in load history on cyclic response of concrete flexural members
[PB83-153403] N83-29741

CANYONS
Vegetational analysis of a canyon ecosystem at Los Alamos
[DE83-008277] N83-29878

CAPACITORS
Testing to quantify the effects of handling of gas dielectric standard capacitors
[PB83-149385] N83-29624
IC-components with monolithic thin layer capacitors
[BMFT-FB-T-83-049] N83-30290

CARBOHYDRATES
Plant growth in controlled environments in response to characteristics of nutrient solutions N83-30026

CARBON
Chemical modification of carbon electrodes
[AD-A125964] N83-29327
Radiation-induced microstructural changes in Ni-C and Pt-C alloys
[DE83-007815] N83-29371
Carbon granule probe microphone for leak detection
[NASA-CASE-NPO-16027-1] N83-29595
Monitoring biotransformation and biodegradation of xenobiotics in simulated aquatic microenvironmental systems
[PB83-153718] N83-29683

CARBON DIOXIDE
Gaseous continuous emission monitoring systems. Performance specification guidelines for SO2, NOx, CO2, O2 and TRS
[PB83-161646] N83-29886
Assessing very long-range impacts from a rapid climate change
[DE82-017229] N83-29937
Thermodynamic consistency test procedure using orthogonal collocation and the Peng-Robinson equation of state
[DE83-007168] N83-30293

CARBON DIOXIDE LASERS
Heterodyne detector/electronics design and alignment of a pulsed CO2 laser wind system
[AD-A126264] N83-29682
Infrared radiation and inversion population of CO2 laser levels in Venusian and Martian atmospheres
[NASA-TM-85057] N83-30341

CARBON FIBER REINFORCED PLASTICS
Use of composites in aero-engines
[PNR-90149] N83-29322

CARBON FIBERS
Structure and growth process of vapor-grown carbon fibers
[NASA-TM-77046] N83-29313
Nonequilibrium disclinations in the carbonaceous mesophase
[AD-A125807] N83-29395
Process development for silicon carbide based structural ceramics
[AD-A125857] N83-29399

CARBON MONOXIDE
National performance audit program: The 1980 proficiency survey for sulfur dioxide, nitrogen dioxide, carbon monoxide, sulfate, nitrate, lead and high volume flow
[PB83-164863] N83-29354
Organosilicon compounds and organosilicon polymer intermediates
[AD-A127752] N83-29403

CARBON 14
Relations between the simultaneous and sequential transfer of 2 nucleons
[DE82-017425] N83-30190

CARBON-CARBON COMPOSITES
Graphite ablation in several gas environments
[AD-A125511] N83-29319
Daze fasteners
[NASA-CASE-LAR-13009-1] N83-29706

CARCINOGENS
Identification and comparative genotoxicity of polycyclic aromatic hydrocarbons and related nitrogen-containing heteroatomic species in products from coal liquefaction processes
[DE83-006939] N83-29312

CARDIOVASCULAR SYSTEM
Autoallergic effects of microwave electromagnetic energy and their influence on the fetus and offspring
N83-29974
Effect of cordiamine and mesatone on ECG under conditions of acute microwave irradiation N83-29977
Research opportunities in cardiovascular deconditioning, phase 1
[NASA-CR-3707] N83-29992

CARRIER WAVES
A FDM master-group signal encoding equipment
[AD-A126158] N83-29566

CARTESIAN COORDINATES
Parabolized Navier-Stokes solutions of separation and trailing-edge flows
[NASA-TM-84378] N83-29635

CASCADE FLOW
Large-scale separation and wake closure/reattachment. The cascade problem
[UTRC83-13] N83-29629
Nonuniqueness in wakes and boundary layers
[UTRC83-15] N83-29630
Degassifying and mixing apparatus for liquids --- potable water for spacecraft
[NASA-CASE-MSC-18936-1] N83-29652

CASUALTIES
Survey and analysis of the heat casualty prevention experiment for Resphiblex 1-81, operation 'Lancer Eagle', 43D, MAU
[AD-A125847] N83-30004

CATALOGS
Catalogue of 20457 star positions obtained by photography in the declination zone -48 deg to -54 deg (1950)
[AD-A126161] N83-30330
CATALOGS (PUBLICATIONS)
International Catalog of Geomagnetic Data
[PB83-161679] N83-29921
CATALYSIS
CO + H sub 2 reactions over nitrogen-modified iron catalysts
[DE83-006579] N83-29335
Relative catalytic activity of iron containing minerals for the hydrogasification of coal
[DE82-012776] N83-29337
Development of alcohol-based synthetic transportation fuels from coal-derived synthesis gases
[DE83-004857] N83-29434
CATALYSTS
Coupling of transport and chemical processes in catalytic combustion N83-29230
Progress in studies on catalyzed gasification of wood
[DE83-009124] N83-29332
Superacids as catalysts for selected hydrocarbon convers
[PB83-166546] N83-29353
Importance of active sites for char gasification in oxygen (air) and carbon dioxide
[PB83-173393] N83-29445
Emission characterization of a spark-ignited, heavy-duty, direct-injected methanol engine
[PB83-156372] N83-29722
NASA Redox Project status summary
[NASA-TM-83401] N83-29810
CATHODES
Current density in cathode spots in the condensed discharge
[AD-A126221] N83-29601
CAUCHY PROBLEM
Application of the theory of boundary value problems in the analysis of a queueing modeling with paired services
[MATH-CENTRE-TRACTS-153] N83-30105
CAUCHY-RIEMANN EQUATIONS
A preconditioned formulation of the Cauchy-Riemann equations
[NASA-CR-172156] N83-30107
CAVES
Cavity detection and delineation research. Part 4: Microgravimetric survey: Manatee Springs Site, Florida
[AD-A125900] N83-29906
CAVITIES
A gas jet impacting a cavity N83-29627
Cavity detection and delineation research. Part 4: Microgravimetric survey: Manatee Springs Site, Florida
[AD-A125900] N83-29906
Analysis of the internal point load test
[PB83-164566] N83-29919
CAVITY RESONATORS
Active tuning of rf cavities
[DE83-007126] N83-29586
A gas jet impacting a cavity N83-29627
CDC COMPUTERS
Basic JCL for the CRAY-1 operating system (COS) with emphasis on making the transition from CDC 7600/SCOPE
[NASA-CR-166499] N83-30053
CEILINGS (METEOROLOGY)
Some new practical models for visibility for German locations where no records exist
[AD-A126339] N83-29936
CELESTIAL BODIES
Detailed observations of NGC 4151 with IUE (International Ultraviolet Explorer). Paper 2: Variability of the continuum from 1978 February to 1980 May, including X-ray and optical observations
[PB83-164947] N83-30338
CELLULOSE
Formation of aromatic and possible oligomeric materials from cellulose liquefaction
[DE83-005558] N83-29432
CELLULOSE NITRATE
Sensitivity characterization of low vulnerability (LOVA) propellants
[AD-A126130] N83-29415
CENSUS
The 1980 land cover for the Puget Sound region
[E83-10360] N83-29771
CENTAUR LAUNCH VEHICLE
Role of simulation and emulation in the development of Shuttle-Centaur (STS-Centaur)
[NASA-TM-83326] N83-29292
CENTER OF GRAVITY
Evaluation of high performance aircrew helmets and oxygen masks
[AD-A126036] N83-30038
CENTIMETER WAVES
Statistics of radio refractivity and atmospheric attenuation in tropical climates --- Africa N83-29505
CENTRAL NERVOUS SYSTEM
Morphological changes in neurons of the central nervous system in response to experimental influence of centimeter-range electromagnetic waves on the body N83-29983
CENTRAL PROCESSING UNITS
Federal Automated Data Processing (ADP) equipment: A compilation of statistics, 1981
[PB83-164384] N83-30045
Integration of new technology in Army libraries, appendices
[AD-A125984] N83-30308
CENTRIFUGAL COMPRESSORS
Centrifugal-reciprocating compressor
[NASA-CASE-NPO-14597-2] N83-29708
CENTRIFUGES
Flow in a partially filled rotating cylinder --- as applied to gas centrifuges utilized for isotope separation
[DE82-018309] N83-29644
CENTRIPETAL FORCE
Influence from coriolis and centripetal accelerations on in-service tire vibrations
[PB83-145185] N83-29469
CERAMIC COATINGS
Creep of plasma sprayed zirconia
[NASA-CR-167868] N83-29393
CERAMICS
Foreign technology alert-bibliography: Ceramics, refractories and glass technology
[PB83-101642] N83-29323
Silicon carbide alloys
[AD-A125968] N83-29398
Process development for silicon carbide based structural ceramics
[AD-A125857] N83-29399
Response of combined electrical stimulation and biodegradable ceramics
[AD-A126300] N83-29401
Mechanical reliability of current alumina and beryllia ceramics used in microwave windows for gyrotrons
[DE83-006360] N83-29404
Development of ceramic automobile turbine engine components
[BMFT-FB-T-83-025] N83-29407
Pressure sintering and creep deformation: A joint modeling approach --- ceramics
[DE83-006516] N83-29738
Commercial high-level-waste management: Options and economics. A comparative analysis of the ceramic and glass waste forms
[DE83-006235] N83-30218
CEREBRUM
A theoretical analysis of the observed calcium anomalies concomitant with the interaction of low intensity electric fields with cerebral tissue
[AD-A126284] N83-29996
CESIUM
Laser-activated electrical switching characteristics of high-current, low-loss thermionic diodes
[AD-A125521] N83-29609
CHANNELS (DATA TRANSMISSION)
Steady state performance of survivable routing procedures for circuit-switched mixed-media networks
[AD-A126213] N83-29610
CHARGE COUPLED DEVICES
Investigations of other operating points for the RCA streak tube in the Lawrence Livermore National Laboratory streak camera
[DE82-019065] N83-29663
CHARGE DISTRIBUTION
Electronic isotope shifts muonic atoms and electron scattering
[DE82-014040] N83-30194
CHARGE EXCHANGE
Nuclear structure in pion scattering and charge exchange
[DE83-007945] N83-30205
Particle physics experiments, 1981
[PB83-164715] N83-30207
Laser-fluorescence measurements of hydrogen and metal densities in the doublet 3 Tokamak
[DE83-008499] N83-30251
CHARGE TRANSFER
Creation of high energy electron tails due to the modified 2-stream instability
[NASA-CR-172819] N83-30171
Relations between the simultaneous and sequential transfer of 2 nucleons
[DE82-017425] N83-30190
CHARGED PARTICLES
Spray impaction, retention and adhesion: An introduction to basis characteristics
[CA-8215] N83-29394
Design analysis and performance evaluation of a two-dimensional camera for accelerated positron-emitter beam injection by computer simulation
[DE83-005866] N83-29661
Methods for two-dimensional charged-particle transport in collisionless plasmas
[DE82-014044] N83-30245
Hot-electron distribution function in high-Z materials
[DE82-008109] N83-30282
CHARM (PARTICLE PHYSICS)
Quark-antiquark bound-state spectroscopy and QCD
[DE83-007062] N83-30204
Particle physics experiments, 1981
[PB83-164715] N83-30207
Numerical studies of the intrinsic charm model
[PB83-164798] N83-30208
CHEBYSHEV APPROXIMATION
Preconditioned minimal residual methods for Chebyshev equations
[NASA-CR-172157] N83-30111
CHEMICAL ANALYSIS
Diffusion-flame studies of the chemical and physical mechanisms of soot formation from aromatic and substituted-aromatic fuels
[DE83-009093] N83-29334
Preconcentration methods for trace element determination
[PB83-172536] N83-29351
Recovery of sulfur and accessory metals from a leaching process residue
[PB83-157651] N83-29383
Domestic swine in physiological research. Part 4: A blood acid-base curve nomogram for immature pigs
[AD-A126081] N83-29971
CHEMICAL BONDS
Metal coordination chemistry: Removal and recovery of metal compounds from heavy crude and shale oils with multidentate ligands
[DE83-006912] N83-29343
Organosilicon compounds and organosilicon polymer intermediates
[AD-A127752] N83-29403
Theory of reactions at a solid surface
[AD-A126202] N83-29697
Restrained least-squares program (RESLSQ) users manual
[AD-A126171] N83-30082
CHEMICAL COMPOSITION
Graphite ablation in several gas environments
[AD-A125511] N83-29319
Recycling municipal ferrous scrap
[PB83-156968] N83-29384
Low temperature cross linking polyimides
[NASA-CASE-LEW-12876-2] N83-29392
Epoxy thermoplastic pavement marking material: Summary of research results and revised specifications
[PB83-164848] N83-29475
Evaluation of low-temperature geothermal potential in Cache Valley, Utah
[DE83-001219] N83-29790
Studies of the gas- and aqueous-phase composition of stratiform clouds
[DE83-005912] N83-29872
Cloudwater acidity measurements and formation mechanisms: Experimental design
[DE83-005911] N83-29874
CHEMICAL ENGINEERING
Membrane separations in chemical processing
[PB83-165068] N83-29355
Lasers in chemical processing
[DE82-016134] N83-29700
CHEMICAL EQUILIBRIUM
An electrochemical rebalance cell for Redox systems
[NASA-TM-83363] N83-29326
CHEMICAL EVOLUTION
Publications of the exobiology program for 1982. A special bibliography
[NASA-TM-85837] N83-30041
CHEMICAL LASERS
Bibliography of Soviet laser developments, no. 55, September - October 1981
[AD-A126022] N83-29686
Bibliography of Soviet laser developments, no. 56, November - December 1981
[AD-A126023] N83-29687
CHEMICAL PROPERTIES
Alternative fuel technology series. Volume 2: Comparative properties of conventional and alternative fuels
[ISBN-0-902937-66-9] N83-29411
A perspective on the role of microcosms in environmental fate and effects assessments
[PB83-165530] N83-29889
CHEMICAL REACTIONS
Combustion Fundamentals Research
[NASA-CP-2268] N83-29208

Pollutant formation in monodisperse fuel spray combustion N83-29213
Superacids as catalysts for selected hydrocarbon convers
[PB83-166546] N83-29353
Membrane separations in chemical processing
[PB83-165068] N83-29355
Reactions of NaCl with gaseous SO3, SO2, and O2
[NASA-TM-83423] N83-29358
Development of a process to produce alcohol at paper mills
[DE83-009668] N83-29422
Ground water quality in southeastern Minnesota
[PB83-154377] N83-29800
Toxicology Information Response Center: A ten-year perspective
[DE82-017430] N83-30005

CHEMICAL REACTORS
Fast computational kinetics program N83-29227

CHEMICAL WARFARE
Porous polymers as adsorbent for mustard gas
[PML-1981-46] N83-29389

CHEMISORPTION
Importance of active sites for char gasification in oxygen (air) and carbon dioxide
[PB83-173393] N83-29445

CHIPS (ELECTRONICS)
Leadless chip carrier packaging and CAD/CAM (Computer-Aided Design/Computer-Aided Manufacturing) supported wire wrap interconnect technology for subnanosecond ECL (Emitter Coupled Logic)
[AD-A126156] N83-30277
IC-components with monolithic thin layer capacitors
[BMFT-FB-T-83-049] N83-30290

CHROMATES
The characterization and performance of thirteen boron/calcium chromate pyrotechnic blends, 2
[DE82-014693] N83-29430

CHROMATOGRAPHY
Mineral separation in a CELSS by ion-exchange chromatography N83-30033

CHROMIUM COMPOUNDS
An electrochemical rebalance cell for Redox systems
[NASA-TM-83363] N83-29326

CHROMIUM STEELS
Hydrogen attack of bainitic 2 1/4 Cr-1Mo steel
[DE82-019169] N83-29370

CHROMOSPHERE
Spicules and surges. Part 1: Examination of two possible models
[NASA-CR-172778] N83-30347

CIRCUITS
Ultrasonic imaging development
[PB83-155994] N83-30007

CIRCULAR CONES
Sensing systems for measuring mechanical properties in ground masses. Volume 3: Vane shear and cone piezometer
[PB83-155960] N83-29793
Sensing systems for measuring mechanical properties in ground masses. Volume 4: Static penetrometer
[PB83-155978] N83-29794

CIRCULATION
Frictional secondary circulation near an upwelled thermocline
[PB83-162024] N83-29965

CITIES
Microcomputers in transportation. Volume 1: Selected readings
[PB83-169904] N83-30048

CLASSIFICATIONS
Computer implemented land cover classification using LANDSAT MSS digital data: A cooperative research project between the National Park Service and NASA. 3: Vegetation and other land cover analysis of Shenandoah National Park
[E83-10362] N83-29773
Application of SEASAT-1 Synthetic Aperture Radar (SAR) data to enhance and detect geological lineaments and to assist LANDSAT landcover classification mapping — Appalachian Region, West Virginia
[E83-10365] N83-29776
Classification systems in information and documentation. Possibilities of further development
[BMFT-FB-ID-83-003] N83-30314

CLAYS
An evaluation of LANDSAT-4 thematic mapper data for their geometric and radiometric accuracies and their relevance to geologic mapping N83-29765
Sensing systems for measuring mechanical properties in ground masses. Volume 3: Vane shear and cone piezometer
[PB83-155960] N83-29793

CLEAR AIR TURBULENCE
Upper tropospheric structures observed with VHF radar at Arecibo N83-29507

CLEARANCES
The matrix of axial and radial plays: The present situation and perspectives --- turbojet engines N83-29253

CLIMATE
Satellite freeze forecast system: Executive summary
[E83-10368] N83-29778
Satellite freeze forecast system
[E83-10369] N83-29779
Satellite freeze forecast system. System configuration definition manual
[E83-10370] N83-29780
Satellite freeze forecast system. Operating/troubleshooting manual
[E83-10371] N83-29781
Satellite freeze forecast system. System software documentation manual
[E83-10372] N83-29782
Terminal forecast reference notebook for Katterbach AAF, Germany
[AD-A126097] N83-29932
Geophysical monitoring for climatic change
[PB83-159905] N83-29948

CLIMATOLOGY
Mississippi Deltaic Plain Region ecological characterization: An ecological atlas. Map narratives
[PB83-157669] N83-29890
Assessing very long-range impacts from a rapid climate change
[DE82-017229] N83-29937

CLINICAL MEDICINE
Use of magnets in medical treatment N83-29986
Survey and analysis of the heat casualty prevention experiment for Resphiblex 1-81, operation 'Lancer Eagle', 43D, MAU
[AD-A125847] N83-30004

CLOSED ECOLOGICAL SYSTEMS
Controlled Ecological Life Support System. First Principal Investigators Meeting
[NASA-CP-2247] N83-30016
The CELSS program: An overview of its structure and use of computer modelling N83-30018
Selection of crop varieties for efficient production using urea, ammonia, nitrite, and nitrate in cells N83-30025
Plant growth in controlled environments in response to characteristics of nutrient solutions N83-30026
To produce nutrients for plant growth N83-30027
Food systems for PCELSS N83-30028
Generic waste management requirements for a Controlled Ecological Life Support System (CELSS) N83-30029
Wet oxidation as a waste treatment method in closed systems N83-30030
Mineral separation in a CELSS by ion-exchange chromatography N83-30033

CLOUD COVER
Some new practical models for visibility for German locations where no records exist
[AD-A126339] N83-29936

CLOUDS
Studies of the gas- and aqueous-phase composition of stratiform clouds
[DE83-005912] N83-29872
Cloudwater acidity measurements and formation mechanisms: Experimental design
[DE83-005911] N83-29874

CLOUDS (METEOROLOGY)
A new characterization of supercooled clouds below 10,000 feet AGL (Above Ground Level)
[FAA-CT-83-22] N83-29922
The 1980 stratospheric-tropospheric exchange experiment
[NASA-TM-84297] N83-29924

CLUSTER ANALYSIS
Evaluation of the radiometric quality of the TM data using clustering and multispectral distance measures N83-29762

CLUTTER
Measurements of long term radar sea clutter statistics N83-29538

COAL
Proceedings of the Fifth Fundamental Combustion Research Contractors Workshop
[PB83-164483] N83-29349
Commercial scale coal test. Volume 1: Selection of camp 1 coal
[DE83-007436] N83-29435
Summary of status of Environmental Protection Agency (EPA), Office of Mobile Sources Characterization Projects as of March, 1982
[PB83-163972] N83-29441
Demonstrated reserve base of coal in the United States on 1 January 1980
[DE83-006471] N83-29789

COAL DERIVED GASES
Development of alcohol-based synthetic transportation fuels from coal-derived synthesis gases
[DE83-004857] N83-29434

COAL GASIFICATION
Relative catalytic activity of iron containing minerals for the hydrogasification of coal
[DE82-012776] N83-29337
Transco medium-Btu coal gasification project. Executive summary
[DE82-009598] N83-29418
Tri-State Synfuels project commercial scale coal test. Volume 2A: Collection and shipment mine, barge, ship and train programs
[DE83-007443] N83-29431
Commercial scale coal test. Volume 4: Coal fines utilization in furnace boilers
[DE83-007450] N83-29433
Commercial scale coal test. Volume 1: Selection of camp 1 coal
[DE83-007436] N83-29435
Importance of active sites for char gasification in oxygen (air) and carbon dioxide
[PB83-173393] N83-29445
Finite-element modeling of thermo-mechanical responses associated with underground coal conversion
[DE83-006748] N83-29848
An assessment of second-generation compressed-air energy-storage concepts
[DE82-019513] N83-29859

COAL LIQUEFACTION
Mechanisms and kinetics of coal hydrogenation
[DE82-016296] N83-29331
International survey of the status of technology of critical components for coal-liquefaction processes
[DE82-015236] N83-29339
Increased automobile fuel efficiency and synthetic fuels: Alternatives for reducing oil imports. Background Paper Number 4: Environmental issues of synthetic transportation fuels from coal
[PB83-161919] N83-29440

COAL UTILIZATION
US Synthetic Fuels Corporation and National Synfuels Policy
[GPO-96-481] N83-29413
Coal-fired MHD combustion development project: Phase 3B
[DE82-015176] N83-29863
Increasing the efficiency of coal-fired power plants by means of a transition to maximum steam conditions
[BMFT-FB-T-83-033] N83-29869

COASTAL ECOLOGY
Literature review of organic matter transport from marshes
[E83-10352] N83-29750

COASTAL WATER
US Coast Pilot 1. Atlantic Coast: Eastport to Cape Cod (19th Edition)
[PB83-157537] N83-29959

COATINGS
Development of low-cost integrated zeolite collector, supplement
[DE83-008484] N83-29840

COAXIAL FLOW
Mass and momentum turbulent transport experiments N83-29222

COBALT
Magnetization of rare earth/cobalt permanent magnets subsequent to assembly in complex rotor structures
[AD-A126322] N83-30163

COCKPITS
The 5th Advanced Aircrew Display Symposium Proceedings
[AD-A126132] N83-29206

CODING
Coding for frequency-hopped spread-spectrum channels with partial-band interference
[AD-A125872] N83-29582
Improved simulations of mesoscale meteorology
[AD-A125815] N83-29928
Delayed binding in PQCC generated compilers
[AD-A125935] N83-30044
Local code generation and compaction in optimizing microcode compilers
[AD-A126026] N83-30076
The application of Monte Carlo codes to neutron dosimetry
[DE82-017635] N83-30154
Application of adjusted data in calculating fission-product decay energies and spectra
[DE82-019182] N83-30193

COHERENT SCATTERING
Influence of raindrop oscillations on coherent forward scattering of microwaves in rain N83-29528

COKE
Importance of active sites for char gasification in oxygen (air) and carbon dioxide
[PB83-173393] N83-29445
COLD WEATHER
Satellite freeze forecast system: Executive summary
[E83-10368] N83-29778
Satellite freeze forecast system
[E83-10369] N83-29779
Satellite freeze forecast system. System software documentation manual
[E83-10372] N83-29782
COLLIMATION
Dual laser optical system and method for studying fluid flow
[NASA-CASE-MFS-25315-1] N83-29680
The axisymmetric instability of a self-pinched beam with a rounded radial density profile
[AD-A126117] N83-30178
COLLISIONAL PLASMAS
Self-consistent electron transport in collisional plasmas
[DE82-014083] N83-30244
COLLISIONLESS PLASMAS
Methods for two-dimensional charged-particle transport in collisionless plasmas
[DE82-014044] N83-30245
COLOR CODING
Color Vision Conference
[AD-A125435] N83-30001
COLOR PHOTOGRAPHY
Water penetration photogrammetry. Volume 1: Feasibility and evaluation study
[AD-A126209] N83-29291
COLOR VISION
Color Vision Conference
[AD-A125435] N83-30001
COLORADO
Solar energy system performance evaluation. Crown Realty 1, Lakewood, Colorado, December 1981 through March 1982
[DE82-019029] N83-29855
COLORADO RIVER (NORTH AMERICA)
Increased automobile fuel efficiency and synthetic fuels. Alternatives for reducing oil imports. Background paper 5: Water availability for synthetic fuels: An assessment of current studies
[PB83-152645] N83-29437
COLUMBIA RIVER BASIN (ID-OR-WA)
Organic geochemistry of deep ground waters — Washington state and Sweden
[DE83-005333] N83-29787
COLUMNS (SUPPORTS)
Behavior and design of reinforced concrete column-type lapped splices subjected to high-intensity cyclic loading
[PB83-165134] N83-29474
COMBINED CYCLE POWER GENERATION
Combined-cycle heat pump analysis program
[PB83-161042] N83-29483
COMBUSTIBLE FLOW
Mass and momentum turbulent transport experiments N83-29222
COMBUSTION
Lean limit phenomena N83-29229
Coupling of transport and chemical processes in catalytic combustion N83-29230
Spontaneous ignition characteristics of hydrocarbon fuel-air mixtures N83-29231
Unsteady flow effects in combustor systems N83-29232
Numerical modeling of turbulent combustion N83-29233
Metal-air battery research and development
[DE82-019881] N83-29864
COMBUSTION CHAMBERS
Analytical calculation of a single jet in cross-flow and comparison with experiment N83-29219
Turbulent combustor flowfield investigation N83-29220
Small gas turbine combustor primary zone study N83-29221
Computations of emissions using a 3-D combustor program N83-29226
Flame radiation measurements N83-29228
Coupling of transport and chemical processes in catalytic combustion N83-29230
Parametric study of flame radiation characteristics of a tubular-can combustor
[NASA-TM-83436] N83-29237
Graphite ablation in several gas environments
[AD-A125511] N83-29319
Evaluation of synthetic-fuel-character effects on rich-lean stationary-gas-turbine combustion systems. Volume 1: Subscale test program
[DE83-901452] N83-29715
Coal-fired MHD combustion development project: Phase 3B
[DE82-015176] N83-29863
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172903] N83-30059
COMBUSTION CONTROL
Small gas turbine combustor primary zone study N83-29221
COMBUSTION EFFICIENCY
Coupling of transport and chemical processes in catalytic combustion N83-29230
COMBUSTION PHYSICS
Combustion Fundamentals Research
[NASA-CP-2268] N83-29208
The NASA broad-specification fuels combustion technology program: An assessment of phase 1 test results
[NASA-TM-83447] N83-29236
Parametric study of flame radiation characteristics of a tubular-can combustor
[NASA-TM-83436] N83-29237
Proceedings of the Fifth Fundamental Combustion Research Contractors Workshop
[PB83-164483] N83-29349
Residential combustion heating system performance analysis study
[PB83-161406] N83-29481
Downhole steam-generator study. Volume 2: Design summary
[DE82-019824] N83-29852
COMBUSTION PRODUCTS
Analysis of refractory fiber insulations and hot face coatings exposed to coal-oil mixture combustion products
[DE82-018210] N83-29321
COMBUSTION STABILITY
Unsteady flow effects in combustor systems N83-29232
COMETS
Infrared molecular emissions from comets
[NASA-TM-85067] N83-30344
COMMAND AND CONTROL
USAF (United States Air Force) avionics master plan
[AD-A125819] N83-29205
A distributed network supporting ocean surveillance
[AD-A125559] N83-29954
Generalized monitoring facility. Users manual, change 4: Computer system manual
[AD-A126234] N83-30068
Generalized monitoring facility. Users manual, change 5: Computer system manual
[AD-A126235] N83-30069
The Naval Data Automation Command: A case study
[AD-A126290] N83-30300
COMMERCE
Research in space commercialization, technology transfer and communications
[NASA-CR-172887] N83-30327
COMMUNICATION
Multiaccess of a slotted channel using a control mini-slot
[AD-A125569UVA-525634/EE82/106] N83-29562
COMMUNICATION EQUIPMENT
Jam resistant communications systems techniques
[AD-A126217] N83-29579
COMMUNICATION NETWORKS
SATNET development and operation, Pluribus Satellite IMP development, Internet operations and maintenance, Mobile Access Terminal Network
[AD-A125959] N83-29563
Communication environments for local networks
[AD-A125441] N83-29573
Steady state performance of survivable routing procedures for circuit-switched mixed-media networks
[AD-A126213] N83-29610
COMMUNICATION SATELLITES
Study of high power L-band space transmitters for 2nd generation INMARSAT
[SCR-518(PSL-83-159)] N83-29460
Site diversity in Earth to satellite links: Radar measurements and theoretical predictions N83-29552
Attenuation of radio waves by atmospheric wet ice and mixed phased hydrometeors N83-29553
EHF dielectric lens antenna for Satellite Communication Systems
[AD-A126214] N83-29578
Research in space commercialization, technology transfer and communications
[NASA-CR-172887] N83-30327
COMPACTING
Local code generation and compaction in optimizing microcode compilers
[AD-A126026] N83-30076
COMPARISON
Specifying reliability as a software attribute
[AD-A125934] N83-30075
COMPATIBILITY
Evaluation of fuel additives for reduction of material imcompatibilities in methanol-gasoline blends
[NASA-CR-168051] N83-29359
Materials compatibility studies with fuel/alcohol mixtures
[AD-A126076] N83-29416
Compatability and accelerated aging study for Li(Si)FeS2 thermally activated batteries
[DE82-009026] N83-29817
COMPILERS
Delayed binding in PQCC generated compilers
[AD-A125935] N83-30044
Compiler features: A survey
[PB83-164418] N83-30046
Local code generation and compaction in optimizing microcode compilers
[AD-A126026] N83-30076
COMPLEX NUMBERS
Tables of spherical Bessel functions of the first and second kinds for complex arguments
[AD-A125876] N83-30130
COMPONENT RELIABILITY
Electrical self-aligning connector
[NASA-CASE-MFS-25211-2] N83-29592
COMPOSITE MATERIALS
SEM/TEM fractography of composite materials
[AD-A125832] N83-29317
Plastics in the 80's
[PB83-163311] N83-29409
Applications of composite gas-turbine components, phase 1
[DE83-006574] N83-29718
COMPOSITE STRUCTURES
Computation of propagation speed and reflection of axially symmetric waves in composite cylinders with application to impedance tube and calibrator
[AD-A125875] N83-29320
Ground test experience with large composite structures for commercial transports
[NASA-TM-84627] N83-29732
Advanced structures technology and aircraft safety
[NASA-TM-85664] N83-29733
COMPRESSED AIR
Fixed-base flywheel storage systems for electric-utility applications: An assessment of economic viability and R and D priorities
[DE83-007171] N83-29827
An assessment of second-generation compressed-air energy-storage concepts
[DE82-019513] N83-29859
COMPRESSED GAS
Development of improved capabilities for computation of gas supercompressibility factors and other properties
[PB83-173369] N83-29444
COMPRESSIBILITY
Numerical simulation for droplet combustion using Lagrangian hydrodynamics N83-29210
Development of improved capabilities for computation of gas supercompressibility factors and other properties
[PB83-173369] N83-29444
COMPRESSION LOADS
Applications of a compression system stability model N83-29260
COMPRESSION TESTS
Modelling compression component stability characteristics: Effects of inlet distortion and fan bypass duct disturbances N83-29261
Cumulative damage model for advanced composite materials
[AD-A126048] N83-29318
Simple strength tests on and hydraulic fracturing of rock material
[PB83-165514] N83-29918
COMPRESSOR BLADES
A theory of rotating stall of multistage axial compressors
[NASA-CR-3685] N83-29175
COMPRESSORS
Flight test experience on military aircraft engine handling N83-29248
Throttle handling related to J85 engine performance and durability: Canadian forces experience N83-29249
COMPUTATION
Development of improved capabilities for computation of gas supercompressibility factors and other properties
[PB83-173369] N83-29444
Competitive argumentation in computational theories at cognition
[AD-A125577] N83-30009
Projections of lawless sequences
[MATH-CENTRE-TRACTS-152] N83-30104

High-performance banded and profile equation solvers for the CRAY-1. Part 1: The unsymmetric case
[AD-A125561] N83-30115
A critique and an appraisal of VLSI models of computation
[AD-A125835] N83-30117
Tables of spherical Bessel functions of the first and second kinds for complex arguments
[AD-A125876] N83-30130
Multirate linear multistep methods for the solution of systems of ordinary differential equations
[DE83-004259] N83-30135
An O(/E/) time algorithm for computing the reliability of a class of directed networks
[PB83-167197] N83-30159

COMPUTATIONAL FLUID DYNAMICS
Applications of the contravariant form of the Navier-Stokes equations
[NASA-TM-83448] N83-29179

COMPUTER AIDED DESIGN
CAD of control systems: Application of nonlinear programming to a linear quadratic formulation
[NASA-CR-172151] N83-29448
Vibration in planetary gear systems with unequal planet stiffnesses
[NASA-TM-83428] N83-29709
Generating natural language explanations in a computer-aided design system
[AD-A126190] N83-30079
Leadless chip carrier packaging and CAD/CAM (Computer-Aided Design/Computer-Aided Manufacturing) supported wire wrap interconnect technology for subnanosecond ECL (Emitter Coupled Logic)
[AD-A126156] N83-30277
Stirling engine design manual, 2nd edition
[NASA-CR-158088] N83-30328

COMPUTER AIDED MANUFACTURING
Leadless chip carrier packaging and CAD/CAM (Computer-Aided Design/Computer-Aided Manufacturing) supported wire wrap interconnect technology for subnanosecond ECL (Emitter Coupled Logic)
[AD-A126156] N83-30277

COMPUTER ASSISTED INSTRUCTION
Generating natural language explanations in a computer-aided design system
[AD-A126190] N83-30079

COMPUTER COMPATIBLE TAPES
LANDSAT imagery: Description of products available from the CSIR Satellite Remote Sensing Centre
[E83-10354] N83-29752

COMPUTER DESIGN
Design of a high-speed digital processing element for parallel simulation
[NASA-TM-83373] N83-29597

COMPUTER GRAPHICS
Interactive analysis of a large aperture Earth observations satellite
[NASA-TM-85638] N83-29304
Three-dimensional perspective software for representation of digital imagery data --- Olympic National Park, Washington
[E83-10359] N83-29770
Interactive analysis of digital terrain elevation and surface feature data bases
[AD-A126310] N83-29784
Data source and information carrier as a base for a spatial-orientated information system
[PB83-166090] N83-29962
Requirements for natural language understanding in a system with graphic displays
[AD-A126065] N83-30072
Thoughts on the evolution of dynamic graphics
[DE83-006146] N83-30084
GKS (Graphical Kernel System), the first graphics standard
[PB83-166595] N83-30090
A review of currently available high performance interactive graphic systems
[PB83-165951] N83-30091
Initial Graphics Exchange Specification (IGES), version 2.0
[PB83-137448] N83-30092

COMPUTER NETWORKS
Communication environments for local networks
[AD-A125441] N83-29573
Automatic detection of loops in leveling networks
[PB83-154641] N83-29801
Automated protocol verification
[AD-A126271] N83-30066
Proceedings of the 1st Space Plasma Computer Analysis Network (SCAN) Workshop --- space plasma computer networks
[NASA-TM-82514] N83-30095
Resource sharing in a network of personal computers
[AD-A126003] N83-30096
An O(/E/) time algorithm for computing the reliability of a class of directed networks
[PB83-167197] N83-30159
Informational technology and its impact on American education
[PB83-174664] N83-30296

COMPUTER PROGRAMMING
Analytical modeling of operating characteristics of premixing-prevaporizing fuel-air mixing passages
N83-29209
Description of STIDAS 2-D. Part 1: General system and program description --- Speech Transmission Index (STI)
[IZF-1982-29-PT-1] N83-29587
Investigate and develop mathematical formulas in support of atmospheric studies
[AD-A125869] N83-29897
GKS (Graphical Kernel System), the first graphics standard
[PB83-166595] N83-30090
Total System Design (TSD) methodology assessment
[AD-A126101] N83-30158

COMPUTER PROGRAMS
Progress in studies on catalyzed gasification of wood
[DE83-009124] N83-29332
PRESS: A computer program for evaluating explosive-material loading processes
[DE82-015256] N83-29427
Influence from coriolis and centripetal accelerations on in-service tire vibrations
[PB83-145185] N83-29469
Static and seismic lateral pressures on Earth retaining structures, appendices
[PB83-164335] N83-29476
Capabilities, limitations, and use of BC SAT-R2 conference software
[NASA-TM-83383] N83-29493
Satellite freeze forecast system. System software documentation manual
[E83-10372] N83-29782
Automatic detection of loops in leveling networks
[PB83-154641] N83-29801
Voice control of an unmanned submersible
[AD-A125523] N83-30039
Delayed binding in PQCC generated compilers
[AD-A125935] N83-30044
FCSC (Federal Conversion Support Center) conversion tools survey
[PB83-172635] N83-30047
Functional specifications for a federal information processing standard data dictionary system
[PB83-169441] N83-30049
PRISM: A general purpose programming system
[AD-A126228] N83-30067
Non-parametric statistical software for the TRS-80 microcomputer
[AD-A126055] N83-30073
Image processing and digitization facility
[AD-A126307] N83-30074
Specifying reliability as a software attribute
[AD-A125934] N83-30075
An enhanced conversion scheme for lexicographic, multiobjective integer programs
[AD-A125527] N83-30077
SENSIT-2D: A two-dimensional cross-section sensitivity-and uncertainty-analysis code
[DE83-004479] N83-30083
Programs for solving polynomial equations
[PB83-167171] N83-30089
Distributed decision making environment
[AD-A126021] N83-30099
High-performance banded and profile equation solvers for the CRAY-1. Part 1: The unsymmetric case
[AD-A125561] N83-30115
High-performance banded equation solver for the CRAY-1. Part 2: The symmetric case
[AD-A125560] N83-30127
Development of the GEM (General Elliptic Marching) package: User-oriented codes for general discretized elliptic and mixed partial differential equations
[AD-A125897] N83-30131
The application of Monte Carlo codes to neutron dosimetry
[DE82-017635] N83-30154
Total System Design (TSD) methodology assessment
[AD-A126101] N83-30158
Numerical calculations of ultrasonic fields
[DE82-013811] N83-30169
Versatile three-dimensional Hamiltonian ray-tracing computer program for acoustic waves in the atmosphere
[PB83-149930] N83-30170
Application of adjusted data in calculating fission-product decay energies and spectra
[DE82-019182] N83-30193
Recently developed methods in neutral-particle transport calculations: Overview
[DE82-014043] N83-30197
Radiation standards and calibrations
[DE82-019748] N83-30200
Propagation properties of surface-wave modes in a quasi-multimode, uniaxially anisotropic, graded-index optical waveguide with circularly cylindrical symmetry
[PB83-165167] N83-30235
Modeling of imploded annular plasmas
[AD-A126179] N83-30238
Neutral beam heating in stellarators: A numerical approach
[DE83-010458] N83-30242
Investigation of the neutron production phases of a large plasma focus device
[IPF-82-12] N83-30262
Standard X-ray diffraction power patterns. Section 19: Data for 51 substances
[PB83-164962] N83-30292
Thermodynamic consistency test procedure using orthogonal collocation and the Peng-Robinson equation of state
[DE83-007168] N83-30293

COMPUTER STORAGE DEVICES
Continued development of the Universal Network Interface Device
[AD-A126031] N83-29569
Federal Automated Data Processing (ADP) equipment: A compilation of statistics, 1981
[PB83-164384] N83-30045
Non-parametric statistical software for the TRS-80 microcomputer
[AD-A126055] N83-30073
A review of currently available high performance interactive graphic systems
[PB83-165951] N83-30091

COMPUTER SYSTEMS PERFORMANCE
Automated hourly weather collective from HRR data input
[PB83-167122] N83-29943
Development of software fault-tolerance techniques
[NASA-CR-172122] N83-30052

COMPUTER SYSTEMS PROGRAMS
Satellite freeze forecast system. System configuration definition manual
[E83-10370] N83-29780
An analysis of sparse matrix storage schemes
[MATH-CENTRE-TRACTS-150] N83-30103

COMPUTER SYSTEMS SIMULATION
A critique and an appraisal of VLSI models of computation
[AD-A125835] N83-30117

COMPUTER TECHNIQUES
Experimental and analytical aspects of atmospheric EHF refractivity N83-29556
Influence of adhesive shear deformation on laminate structural behavior with application to parabolic trough solar collectors
[DE83-010293] N83-29838
Advanced seismological research and improved yield determination
[AD-A126001] N83-29895
Competitive argumentation in computational theories at cognition
[AD-A125577] N83-30009
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172902] N83-30058
Development and qualification of computer-aided assessment (CAS)
[AD-A125477] N83-30078
European Scientific Notes, Volume 36, Number 12
[AD-A126057] N83-30353

COMPUTERIZED SIMULATION
Large-scale circuit simulation
[AD-A125941] N83-29607
Design analysis and performance evaluation of a two-dimensional camera for accelerated positron-emitter beam injection by computer simulation
[DE83-005866] N83-29661
Computer simulation of concrete penetration by shaped-charged jets
[DE83-007359] N83-29720
Comparison of road load simulator test results with track tests on electric vehicle propulsion system
[NASA-TM-83393] N83-29811
Geophysical plasmas and atmospheric modeling
[AD-A126341] N83-29904
Improved simulations of mesoscale meteorology
[AD-A125815] N83-29928
Earthquakes and earthquake predictions: Simulating their economic effects
[PB83-163725] N83-29939

Infrared detection of microwave induced surface currents on flat plates
[AD-A126207] N83-30227
Management of reference information services: A dynamic resource allocation and simulation model
[DE82-019879] N83-30312

COMPUTERS
Report of the 67th National Conference on Weights and Measures 1982
[PB83-167148] N83-29473
Federal Automated Data Processing (ADP) equipment: A compilation of statistics, 1981
[PB83-164384] N83-30045
Informational technology and its impact on American education
[PB83-174664] N83-30296

CONCENTRIC CYLINDERS
Flow resistivity instrument
[NASA-CASE-LAR-13053-1] N83-29783

CONCRETE STRUCTURES
Behavior and design of reinforced concrete column-type lapped splices subjected to high-intensity cyclic loading
[PB83-165134] N83-29474

CONCRETES
Water release from heated concretes
[DE82-015196] N83-29457
Latex improvement of recycled asphalt pavement
[PB83-152694] N83-29460
An evaluation of the design and analytical seismic response of a seven-story reinforced concrete frame-wall structure
[PB83-157628] N83-29470
Effects of variation in load history on cyclic response of concrete flexural members
[PB83-153403] N83-29741
Mechanical behavior of shear wall vertical boundary members: An experimental investigation
[PB83-159764] N83-29742

CONDENSATION
Technical manual for continuous flow LHe4 cryopump J.N. 2977
[AD-A125833] N83-29454

CONDUCTION BANDS
Experimental studies of lateral electron transport in gallium arsenide-aluminum gallium arsenide heterostructures
[AD-A125858] N83-30275

CONDUCTIVE HEAT TRANSFER
Design and development of multi-kW power electronic transformers --- for long duration space applications
[NASA-CR-168082] N83-29596

CONFERENCES
The 5th Advanced Aircrew Display Symposium Proceedings
[AD-A126132] N83-29206
Combustion Fundamentals Research
[NASA-CP-2268] N83-29208
Engine Handling
[AGARD-CP-324] N83-29241
Report of the 67th National Conference on Weights and Measures 1982
[PB83-167148] N83-29473
Wave propagation and remote sensing --- conferences
[ESA-SP-194] N83-29494
Proceedings of the IFAC Symposium on Theory and Application of Digital Control. Volume 1: Discussion papers
[PB83-163923] N83-29677
Proceedings of the IFAC Symposium on Theory and Application of Digital Control. Volume 2: Discussion papers
[PB83-163931] N83-29678
Innovation for maintenance technology improvements
[PB83-149450] N83-29728
LANDSAT-4 Scientific Characterization: Early Results Symposium
[E83-10356] N83-29754
Proceedings of the WEFAX Users' Conference for National and International Users of GOES WEFAX Services
[PB83-161117] N83-29947
Color Vision Conference
[AD-A125435] N83-30001
Controlled Ecological Life Support System. First Principal Investigators Meeting
[NASA-CP-2247] N83-30016
Proceedings of the 1st Space Plasma Computer Analysis Network (SCAN) Workshop --- space plasma computer networks
[NASA-TM-82514] N83-30095
Neutral-particle-beam production and injection
[DE83-006966] N83-30201
Forestry information systems and terminology
[PB83-156158] N83-30315
Emergency Medical Service (EMS): Rotorcraft Technology Workshop
[NASA-CR-166495] N83-30325
High Energy Astrophysics Laboratory Contributions to the 18th International Cosmic Ray Conference
[NASA-TM-85034] N83-30351

CONFIDENCE LIMITS
Confidence envelopes for monotonic functions: Principles, derivations, and examples
[AD-A126230] N83-30151

CONGRESSIONAL REPORTS
Air disaster litigation
[GPO-97-336] N83-29185
Army helicopter improvement program's future may depend on success in controlling cost
[PB83-168187] N83-29202
Methanol as an alternate transportation fuel
[GPO-12-626] N83-29412
US Synthetic Fuels Corporation and National Synfuels Policy
[GPO-96-481] N83-29413
Oversight of Department of Energy research and development facilities
[GPO-99-906] N83-29807
Fusion Energy Workshop
[PUBL-97-128] N83-30236
Engineering and Science Manpower Act of 1982
[GPO-96-196] N83-30323
National Aeronautics and Space Administration Authorization Act, 1983 N83-30324

CONICAL FLOW
Finite area method for nonlinear supersonic conical flows
[NASA-CR-172148] N83-29177

CONIFERS
Utilization of LANDSAT multispectral data in geobotanical investigations: The location of ironstone gravel in the Sam Houston National Forest
[E83-10361] N83-29772

CONSERVATION LAWS
Limits on neutrino-antineutrino transitions from a study of high energy neutrino interactions
[PB83-165944] N83-30213

CONSTANTS
Constant temperature and thermal gradient investigations of the near field subseabed environment: Chemical and thermodiffusional effects
[DE82-018589] N83-29958

CONSTRAINTS
Investigation of crew restraint system biomechanics
[AD-A126199] N83-29190
Non-linear regression
[PB83-167643] N83-30146

CONSTRUCTION
Masonry structural design for buildings
[AD-A126314] N83-29452
Elastomeric bearings design, construction and materials
[PB83-149211] N83-29723
Development of low-cost integrated zeolite collector, supplement
[DE83-008484] N83-29840

CONTAINERLESS MELTS
Method and apparatus for supercooling and solidifying substances
[NASA-CASE-MFS-25242-1] N83-29650

CONTAINERS
Protecting against failure by brittle fracture in ferritic-steel shipping containers greater than 4 inches thick
[DE83-007462] N83-29372

CONTAMINANTS
Effects of uranium oxides on some of the algae native to Eglin Air Force Base, Florida
[AD-A125478] N83-29970

CONTAMINATION
Adequacy of disinfection for control of newly recognized waterborne pathogens
[PB83-152181] N83-29884

CONTEXT FREE LANGUAGES
On language families generated by commutative languages
[ISSN-0355-0087] N83-30051

CONTINENTAL SHELVES
The use of synthetic aperture radar to detect and chart submerged navigation hazards
[AD-A126071] N83-29567

CONTINUOUS RADIATION
Summary of rules for sampling, decimation, and interpolation of experimental data
[DE82-016360] N83-30313

CONTROL
Some issues in comparability of results and analytical methodology in CELSS waste processing research
N83-30031

CONTROL EQUIPMENT
Manufacturing and cost analyses of heliostats based on the second-generation heliostat-development study
[DE83-006664] N83-29835

CONTROL THEORY
A new approach to reheat control N83-29268
CELSS system control overview N83-30019
Control problems in autonomous life support systems N83-30020
Programs for solving polynomial equations
[PB83-167171] N83-30089
Chained aggregation and control system design: A geometric approach
[AD-A125853] N83-30098
Singular perturbations and time-scale methods in control theory: Survey 1976-1982
[AD-A125908] N83-30100
Multivariable internal model control
[DE83-007320] N83-30101
Time scales, coherency, and weak coupling
[AD-A125845] N83-30118
The inclusion principle for dynamic systems
[DE83-006412] N83-30140

CONTROL VALVES
International survey of the status of technology of critical components for coal-liquefaction processes
[DE82-015236] N83-29339

CONTROLLABILITY
Throttle handling related to J85 engine performance and durability: Canadian forces experience N83-29249
Operational and maintenance aspects of the introduction of an advanced fighter type N83-29250

CONTROLLED ATMOSPHERES
Studies on maximum yield of wheat and other small grains in controlled environments N83-30024

CONTROLLERS
Memory-based parallel data output controller
[NASA-CASE-GSC-12447-2] N83-29302
Data highway terminal controller
[NASA-TM-77241] N83-30042
Case-studies in direct digital control of stochastic systems
[OUEL-1430/82] N83-30102

CONVECTION
Energy transport in porous-insulator systems. 2: Performance of vertical enclosures
[DE82-019894] N83-29643
Forced- and natural-convection studies on solar collectors for heating and cooling applications
[DE83-009863] N83-29841
National severe local storms operations plan
[PB83-163998] N83-29940

CONVECTION CURRENTS
The operational meteorology of convective weather. Volume 1: Operational mesoanalysis
[PB83-162321] N83-29941

CONVECTIVE FLOW
Time-dependent convection --- in microgravity
[BMFT-FB-W-83-001] N83-29648

CONVECTIVE HEAT TRANSFER
Convective heat transfer in internal gas flows with temperature-dependent properties
[AD-A125901] N83-29640

CONVERGENCE
Convergence characteristics of nonlinear vortex-lattice methods for configuration aerodynamics
[NASA-TM-84371] N83-29181
Executive committee report: Geotechnical instrumentation working group meeting
[DE82-012837] N83-29664
Legendre-Tau approximations for functional differential equations
[NASA-CR-172155] N83-30108
Moments of the minimum of a random walk and complete convergence
[AD-A125768] N83-30148

COOLING
Graphite ablation in several gas environments
[AD-A125511] N83-29319
An experimental study of single media thermocline thermal-energy storage
[DE82-006769] N83-29823
Analysis of the adsorption process and of desiccant cooling systems: A pseudo- steady-state model for coupled heat and mass transfer
[DE83-005752] N83-29828
Solar energy system performance evaluation. Scottsdale Courthouse, Scottsdale, Arizona, March, April, July, August, and October 1981 through February 1982
[DE82-019030] N83-29854
Quality of inspections utilizing infrared technology on weatherization retrofit installations
[PB83-146936] N83-30234

COOLING SYSTEMS
Cooling by conversion of para to ortho-hydrogen
[NASA-CASE-GSC-12770-1] N83-29324

Emissions and fuel economy of the Kat's engine block heater device
[PB83-165548] N83-29724

COORDINATE TRANSFORMATIONS
Three-dimensional perspective software for representation of digital imagery data --- Olympic National Park, Washington
[E83-10359] N83-29770
The inclusion principle for dynamic systems
[DE83-006412] N83-30140

COORDINATES
Analytical calculation of a single jet in cross-flow and comparison with experiment N83-29219
Automatic detection of loops in leveling networks
[PB83-154641] N83-29801
International Catalog of Geomagnetic Data
[PB83-161679] N83-29921
A preconditioned formulation of the Cauchy-Riemann equations
[NASA-CR-172156] N83-30107

COPOLYMERIZATION
Cross-linking reactions of thermally stable high performance polymers
[AD-A125967] N83-29397

COPOLYMERS
Phase equilibria and transition in mixtures of a homopolymer and a block copolymer. 1: Small-angle X-ray scattering study
[AD-A125818] N83-29396
Electroactive polymers as antistatic materials
[AD-A126102] N83-29400

COPPER
Recovery of hydrogen from hydrogen sulfide: Bench scale studies of the reaction of hydrogen sulfide with liquid copper
[DE83-005947] N83-29336
Recycling municipal ferrous scrap
[PB83-156968] N83-29384
Effect of industrial frequency electric field (50 Hz) on metabolism of copper, iron and metalloenzymes bound to them (experimental research) N83-29985

CORIOLIS EFFECT
Influence from coriolis and centripetal accelerations on in-service tire vibrations
[PB83-145185] N83-29469

CORN
Direct enzymatic extraction of starch from corn as an energy-saving alternative to production of high-fructose syrup
[DE82-008314] N83-29822

CORNER FLOW
Adverse pressure gradient corner flows
[AD-A126059] N83-29639

CORONAL HOLES
Solar observations during Skylab, April 1973 - February 1974. 1: Coronal X-ray structure. 2: Solar flare activity
[NASA-CR-172824] N83-30348

CORONAL LOOPS
Solar observations during Skylab, April 1973 - February 1974. 1: Coronal X-ray structure. 2: Solar flare activity
[NASA-CR-172824] N83-30348

CORRELATION
Correlation between precision gravity and subsidence measurements at Cerro Prieto
[DE83-005870] N83-29907

CORROSION
Reactions of NaCl with gaseous SO3, SO2, and O2
[NASA-TM-83423] N83-29358
Removal of hydrogen from plated high strength steel by baking: A statistically designed study
[AD-A126100] N83-29366
FSA field test report, 1980 - 1982
[NASA-CR-172863] N83-29808
Environmental degradation of solar optical materials. Volume 1: Literature survey
[DE83-010298] N83-29837

CORROSION PREVENTION
Evaluation of fuel additives for reduction of material incompatibilities in methanol-gasoline blends
[NASA-CR-168061] N83-29359
Reduced-pollution corrosion-protection systems
[PB83-153056] N83-29378

CORROSION RESISTANCE
Structure and properties of nickel-boron-layers
[BMFT-FB-T-82-241] N83-29374
Corrosion control: Why the laboratory needs to be involved
[PB83-152009] N83-29380

CORRUGATED PLATES
Curved cap corrugated sheet
[NASA-CASE-LAR-12884-1] N83-29446

COSMOLOGY
Formation of universes in spaces of varying dimensionality
[PR-775] N83-30334

COSMONAUTS
Post-flight interview with Berezevoy and Lebedev N83-29281

COSPAS
Satellite orbit predictor
[NASA-TM-85015] N83-29293

COST ANALYSIS
Army helicopter improvement program's future may depend on success in controlling cost
[PB83-168187] N83-29202
Platinum availability - market economy countries: A minerals availability system appraisal
[PB83-156869] N83-29385
Teleoperator Maneuvering System (TMS) benefits assessment study. Volume 1: Executive summary
[NASA-CR-170795] N83-30034
Measures of value in a linear-programming model of the US energy system
[DE83-006685] N83-30087

COST EFFECTIVENESS
Evolutionary space platform concept study. Volume 2, part 2: Manned space platform concepts
[NASA-CR-170829] N83-29306

COST ESTIMATES
Army helicopter improvement program's future may depend on success in controlling cost
[PB83-168187] N83-29202
Residential demand for energy. Volume 1: Residential energy demand in the US
[DE82-903277] N83-29818
Department of the Air Force supporting data for fiscal year 1984 budget estimates submitted to Congress, January 31, 1983. Descriptive summaries, research, development, test and evaluation
[AD-A125932] N83-30301

COSTS
OTEC plants for todays island market
[DE83-008670] N83-29847

COUETTE FLOW
Thresholds for the onset of fluid and magnetofluid turbulence
[DE82-017202] N83-29642

COULOMB POTENTIAL
Electronic isotope shifts muonic atoms and electron scattering
[DE82-014040] N83-30194

COUNTERMEASURES
Fiber optics in aircraft applications
[AD-A126165] N83-30230

COUPLED MODES
Beam-profile measurement of laser pulses using a spatial filter to sample the hermite modes for a string of pulses
[PB83-164996] N83-29705

COUPLING
Amplitude and phase of surface pressure produced by space transportation system: Mission 5
[AD-A125846] N83-29300
States of the art and practice in the optimum seismic design and analytical response prediction of r/c frame-wall structures
[PB83-147736] N83-29465
Gluballs: A status report
[DE82-009519] N83-30188

COUPLING CIRCUITS
Spacecraft IF switch matrix for wideband service applications in 30/20 GHz communications satellite systems: Proof-of-concept model, executive summary
[NASA-CR-168175] N83-29492

COVERALLS
Fuel fire tests of selected assemblies
[AD-A125820] N83-29450

CRACK GEOMETRY
Applications of energy-release-rate techniques to part-through cracks in plates and cylinders, volume 2. ORVIRT: A finite element program for energy release rate calculations for 2-dimensional and 3-dimensional crack models
[DE83-007081] N83-29739

CRACK INITIATION
Propagation elastic-plastic fields: Asymptotic analysis of plane strain crack growth and restrictions on moving surfaces of strong discontinuity
[DE82-018820] N83-29737
Mechanical behavior of shear wall vertical boundary members: An experimental investigation
[PB83-159764] N83-29742
Step cracks: Theory, experiment, and field observation
[DE82-014558] N83-29911

CRACK PROPAGATION
Effect of microstructure and internal hydrogen on fatigue crack propagation of ultrahigh strength steels N83-29357
Effect of the test environment on creep crack growth rates for nickel base alloys. A study of creep crack growth in 2219-T851 aluminum alloy using a computerized testing system
[AD-A125698] N83-29361
Stress intensity factor distribution for natural flaws grown under mode 1 loading using 3-d photoelasticity N83-29730
Load ratio and environmental effects on fatigue crack growth rates for several ship steels
[AD-A126285] N83-29735
Propagation elastic-plastic fields: Asymptotic analysis of plane strain crack growth and restrictions on moving surfaces of strong discontinuity
[DE82-018820] N83-29737
Step cracks: Theory, experiment, and field observation
[DE82-014558] N83-29911

CRACKING (FRACTURING)
Hydrogen attack of bainitic 2 1/4 Cr-1Mo steel
[DE82-019169] N83-29370
Load ratio and environmental effects on fatigue crack growth rates for several ship steels
[AD-A126285] N83-29735

CRACKS
Stress intensity factors for radial cracks in a pre-stressed, thick-walled cylinder of strain-hardening materials
[AD-A125552] N83-29736

CRASHWORTHINESS
Advanced structures technology and aircraft safety
[NASA-TM-85664] N83-29733

CRAY COMPUTERS
Basic JCL for the CRAY-1 operating system (COS) with emphasis on making the transition from CDC 7600/SCOPE
[NASA-CR-166499] N83-30053
High-performance banded and profile equation solvers for the CRAY-1. Part 1: The unsymmetric case
[AD-A125561] N83-30115
High-performance banded equation solver for the CRAY-1. Part 2: The symmetric case
[AD-A125560] N83-30127

CREEP ANALYSIS
Creep of plasma sprayed zirconia
[NASA-CR-167868] N83-29393
Pressure sintering and creep deformation: A joint modeling approach --- ceramics
[DE83-006516] N83-29738

CREEP PROPERTIES
Effect of the test environment on creep crack growth rates for nickel base alloys. A study of creep crack growth in 2219-T851 aluminum alloy using a computerized testing system
[AD-A125698] N83-29361

CREEP TESTS
Mechanical properties of the spinal ligaments of primates. Part 1: Cyclic loading. Part 2: Mathematical modeling
[AD-A125540] N83-29968

CRITERIA
Biomechanics of head tolerance criteria --- impact injuries
[NPL-DMA(A)64] N83-29990
An engineering assessment of head tolerance criteria
[NPL-DMA(A)63] N83-30015

CRITICAL LOADING
Portable 90 deg proof loading device
[NASA-CASE-MSC-20250-1] N83-29707

CROP CALENDARS
Agricultural land cover mapping in the context of a geographically referenced digital information system --- Carroll, Macon, and Gentry Counties, Missouri
[E83-10357] N83-29768

CROP DUSTING
Atomizers for the aerial application of herbicides: Ideal and available
[CA-8207] N83-29832

CROP GROWTH
Selection of crop varieties for efficient production using urea, ammonia, nitrite, and nitrate in cells N83-30025

CROP IDENTIFICATION
Agricultural land cover mapping in the context of a geographically referenced digital information system --- Carroll, Macon, and Gentry Counties, Missouri
[E83-10357] N83-29768

CROP VIGOR
Use of remote sensing for land use policy formulation
[E83-10326] N83-29747

CROSS FLOW
Influence of a large free stream disturbance level on dynamics of a jet in a cross flow N83-29217
Analytical calculation of a single jet in cross-flow and comparison with experiment N83-29219

CROSS POLARIZATION
Wave propagation and remote sensing --- conferences
[ESA-SP-194] N83-29494

First global results of the European Space Agency OTS propagation campaign N83-29511
Cross polarisation on terrestrial microwave links during clear weather N83-29527

CROSSLINKING
Low temperature cross linking polyimides [NASA-CASE-LEW-12876-2] N83-29392
Cross-linking reactions of thermally stable high performance polymers [AD-A125967] N83-29397

CRUDE OIL
Metal coordination chemistry: Removal and recovery of metal compounds from heavy crude and shale oils with multidentate ligands [DE83-006912] N83-29343
International energy indicators, February - March 1982 [DE82-014879] N83-29824
Environmental assessment data base for petroleum refining wastewaters and residuals [PB83-164749] N83-30316

CRUSHING
Analysis, scale modeling, and full-scale tests of low-level nuclear-waste-drum response to accident environments [DE83-007587] N83-30217

CRUSTAL FRACTURES
Reports on crustal movements and deformations --- bibliography [NASA-TM-85041] N83-29894

CRYOGENICS
The effect of extreme temperatures on the elastic properties and fracture behavior of graphite/polyimide composites [NASA-CR-172143] N83-29315

CRYOPUMPING
Technical manual for continuous flow LHe4 cryopump J.N. 2977 [AD-A125833] N83-29454

CRYSTAL DEFECTS
Search for far infrared radiation from optically pumped defect modes [AD-A125940] N83-29685
Permanent damage effects in Si and AlGaAs/GaAs photodiodes [DE82-018292] N83-29866
Materials characterization of silicon and analysis of recombination processes and impurities [BMFT-FB-T-83-06] N83-30291

CRYSTAL GROWTH
Method and apparatus for supercooling and solidifying substances [NASA-CASE-MFS-25242-1] N83-29650
Spectroscopic investigations of materials for tunable infrared lasers [AD-A125538] N83-29689
Experimental determination of the thin film growth mechanism N83-30267
Method for growing low defect, high purity crystalline layers --- photovoltaic cells [NASA-CASE-NPO-15813-1] N83-30269
Solid-liquid contacting in industrial crystalizers and its influence on product size distribution [WTHD-150] N83-30270
Advanced methods for preparation and characterization of infrared detector materials [NASA-CR-170798] N83-30271

CRYSTAL LATTICES
Diagrams for the free energy and density weight factors of the Ising models [AD-A126295] N83-30278
Standard X-ray diffraction power patterns. Section 19: Data for 51 substances [PB83-164962] N83-30292

CRYSTAL OSCILLATORS
Phase 2B prototype redesign, tactical rubidium frequency standard [AD-A126320] N83-29658

CRYSTAL STRUCTURE
Structures and polarized electronic absorption spectra of dimolybdenum tetraformate crystals [DE83-004863] N83-30281
Devil's staircase and order without periodicity in classical condensed matter [DE82-015744] N83-30283

CRYSTAL SURFACES
Effects of surface preparation on the properties of single crystal CdTe junctions N83-30266

CRYSTALLINITY
Application of NURE data to the study of crystalline rocks in the Wyoming uranium province [DE83-008323] N83-29914

CRYSTALLIZATION
Direct observation of time-temperature-transformation curves for crystallization of ice from solutions by a homogeneous mechanism [AD-A126044] N83-30279

CRYSTALLOGRAPHY
Focusing and imaging sharp line X-ray and gamma-ray sources using variable-metric diffraction crystals [DE83-007789] N83-30285

CRYSTALS
Solid-liquid contacting in industrial crystalizers and its influence on product size distribution [WTHD-150] N83-30270
European Scientific Notes, Volume 36, Number 12 [AD-A126057] N83-30353

CULTURE TECHNIQUES
Candidate species selection: Cultural and photosynthetic aspects N83-30022
Studies on maximum yield of wheat and other small grains in controlled environments N83-30024

CURRENT DENSITY
Current density in cathode spots in the condensed discharge [AD-A126221] N83-29601
Laser-activated electrical switching characteristics of high-current, low-loss thermionic diodes [AD-A125521] N83-29609

CURVATURE
Submodular set functions, matroids and the greedy algorithm: Tight worst-case bounds and some generalizations of the Rado-Edmonds theorem [AD-A124981] N83-30134

CURVES (GEOMETRY)
Adaptation of pultrusion to the manufacture of helicopter components [AD-A126291] N83-29171
Curved cap corrugated sheet [NASA-CASE-LAR-12884-1] N83-29446
Spacefilling curves and routing problems in the plane [AD-A126309] N83-30125

CUTTING
Cutting with diamond wire: Cutting procedures and suggested uses N83-29447

CYANIDES
Recovery of precious metals from cyanide solutions, plating baths and liquid residues from homogeneous catalysis processes [BMFT-FB-T-83-030] N83-29347

CYCLIC LOADS
Behavior and design of reinforced concrete column-type lapped splices subjected to high-intensity cyclic loading [PB83-165134] N83-29474

CYCLOHEXANE
Nematic liquid crystals for display systems [BMFT-FB-T-83-004] N83-30286

CYCLONES
Automatic recognition of mesocyclones from single Doppler radar data [AD-A125854] N83-29929
Evaluation of the tropical cyclone spiral linearization technique [AD-A126007] N83-29934

CYCLOTRON RADIATION
Selective non-resonant acceleration of 3He++ and heavy ions by H+ cyclotron waves [NASA-CR-172820] N83-30182

CYCLOTRON RESONANCE DEVICES
Theory of gyrotron amplifiers in a disk or a helix loaded waveguide [AD-A126115] N83-29604

CYCLOTRONS
Theory of gyrotron amplifier in a tape helix loaded waveguide [AD-A126114] N83-29603

CYLINDRICAL BODIES
The drag coefficient of cylindrical spacecraft in orbit at altitudes greater than 150 km [NASA-TM-85043] N83-29294
Stress intensity factors for radial cracks in a pre-stressed, thick-walled cylinder of strain-hardening materials [AD-A125552] N83-29736
Propagation properties of surface-wave modes in a quasi-multimode, uniaxially anisotropic, graded-index optical waveguide with circularly cylindrical symmetry [PB83-165167] N83-30235

D

DAMAGE ASSESSMENT
Optical probe for steam-generator-tube dent measurement [DE83-901484] N83-29668

DATA ACQUISITION
Validation flight test of UH-60A for Rotorcraft Systems Integration Simulator (RSIS) [AD-A125428] N83-29201
The 10-MWe central-receiver solar-thermal pilot-plant test operation plan [DE83-009737] N83-29843
International Catalog of Geomagnetic Data [PB83-161679] N83-29921

DATA BASE MANAGEMENT SYSTEMS
Satellite freeze forecast system [E83-10369] N83-29779
Microcomputers in transportation. Volume 1: Selected readings [PB83-169904] N83-30048
Advanced type placement and geonames databases: Comprehensive coordination plan [AD-A126241] N83-30299

DATA BASES
Foreign technology alert-bibliography: Ceramics, refractories and glass technology [PB83-101642] N83-29323
Process parameter effects on arc physics and heat flow in GTAW [DE82-017269] N83-29717
Investigate and develop mathematical formulas in support of atmospheric studies [AD-A125869] N83-29697
Toxicology Information Response Center: A ten-year perspective [DE82-017430] N83-30005
For operation of the Computer Software Management and Information Center (COSMIC) [NASA-CR-172906] N83-30054
Requirements for natural language understanding in a system with graphic displays [AD-A126065] N83-30072
Image processing and digitization facility [AD-A126307] N83-30074
CODASYL Query Language Flat (CQLF) specifications [PB83-164376] N83-30088
Comparison of linear and nonlinear random field estimators [PB83-169755] N83-30145
Rand data base of Soviet high-current particle-beam R&D [AD-A125536] N83-30181
Application of adjusted data in calculating fission-product decay energies and spectra [DE82-019182] N83-30193
Advanced type placement and geonames databases: Comprehensive coordination plan [AD-A126241] N83-30299
The 3 papers on rule-based estimation of statistics on databases [AD-A126198] N83-30310
Forestry information systems and terminology [PB83-156158] N83-30315
Environmental assessment data base for petroleum refining wastewaters and residuals [PB83-164749] N83-30316
Notes for medical catalogers, 1982 [PB83-170860] N83-30317
Distributed information delivery system. Design manual, version 1.0 [PB83-148809] N83-30321
Distributed information delivery system module descriptions, version 1.0 [PB83-156703] N83-30322

DATA CONVERTERS
FCSC (Federal Conversion Support Center) conversion tools survey [PB83-172635] N83-30047

DATA CORRELATION
Instrument for determining coincidence and elapse time between independent sources of random sequential events [NASA-CASE-LAR-12531-1] N83-29651

DATA LINKS
Evaluation of an airborne terminal for a digital data link in aviation [DFVLR-FB-83-05] N83-29196
Steady state performance of survivable routing procedures for circuit-switched mixed-media networks [AD-A126213] N83-29610
Advanced seismological research and improved yield determination [AD-A126001] N83-29895

DATA MANAGEMENT
The Naval Data Automation Command: A case study [AD-A126290] N83-30300
The Navy Mental Health Information System (NAMHIS): An overview [AD-A126087] N83-30309

DATA PROCESSING
Operational engine usage N83-29246
Preconcentration methods for trace element determination [PB83-172536] N83-29351
An offsetting technique to study oscillations in direction of arrival in Earth-space paths N83-29509

Characterization of material flaws using ultrasonic ramp responses
[DE83-006123] N83-29727
SEASAT synthetic-aperture radar data user's manual
[E83-10321] N83-29746
Spatial resolution estimation of LANDSAT-4 TM and MSS data N83-29766
Computer implemented land cover classification using LANDSAT MSS digital data: A cooperative research project between the National Park Service and NASA. 3: Vegetation and other land cover analysis of Shenandoah National Park
[E83-10362] N83-29773
Investigate and develop mathematical formulas in support of atmospheric studies
[AD-A125869] N83-29897
Federal Automated Data Processing (ADP) equipment: A compilation of statistics, 1981
[PB83-164384] N83-30045
Functional specifications for a federal information processing standard data dictionary system
[PB83-169441] N83-30049
Processing of digital ionograms
[AD-A125831] N83-30065
CODASYL Query Language Flat (CQLF) specifications
[PB83-164376] N83-30088
A review of currently available high performance interactive graphic systems
[PB83-165951] N83-30091
The Naval Data Automation Command: A case study
[AD-A126290] N83-30300

DATA PROCESSING EQUIPMENT
Continued development of the Universal Network Interface Device
[AD-A126031] N83-29569

DATA PROCESSING TERMINALS
Pressure altitude tests of the Army AN/MSQ-114 control terminal
[AD-A125524] N83-29572

DATA REDUCTION
Investigation of the effects of external current systems on the MAGSAT data utilizing grid cell modeling techniques
[E83-10358] N83-29769
An O(/E/) time algorithm for computing the reliability of a class of directed networks
[PB83-167197] N83-30159

DATA SAMPLING
Summary of rules for sampling, decimation, and interpolation of experimental data
[DE82-016360] N83-30313

DATA SIMULATION
In-progress absolute radiometric inflight calibration of the LANDSAT-4 sensors N83-29763

DATA STRUCTURES
Algorithms and data structures for adaptive multigrid elliptic solvers
[NASA-CR-172158] N83-30056
An analysis of sparse matrix storage schemes
[MATH-CENTRE-TRACTS-150] N83-30103

DATA TRANSMISSION
SATNET development and operation, Pluribus Satellite IMP development, Internet operations and maintenance, Mobile Access Terminal Network
[AD-A125959] N83-29563
Data transmission systems
[AD-A126168] N83-29584
Data highway terminal controller
[NASA-TM-77241] N83-30042
Fiber optics in aircraft applications
[AD-A126165] N83-30230

DECAY
Rare kaon decays at LAMPF 2
[DE82-019191] N83-30187

DECAY RATES
Neutrino oscillations: Present and future experiments
[DE82-903207] N83-30186
Application of adjusted data in calculating fission-product decay energies and spectra
[DE82-019182] N83-30193
New-particle spectroscopy, quarkonium and gluonic mesons
[DE83-007012] N83-30203
Particle physics experiments, 1981
[PB83-164715] N83-30207

DECISION MAKING
Requirements for natural language understanding in a system with graphic displays
[AD-A126065] N83-30072
Distributed decision making environment
[AD-A126021] N83-30099
Invariant multiplicative efficiency and piecewise Cobb-Douglas envelopments
[AD-A126239] N83-30157
Modeling and analysis of teams of interacting decisionmakers with bounded rationality
[AD-A125582] N83-30298
Towards a prescriptive organization theory of decision aiding for risk management. Phase 1: Conceptual development
[PB83-156109] N83-30304

DECISION THEORY
Decomposition of time scales in linear systems and Markovian decision processes
[AD-A125852] N83-30119

DECOMMUTATORS
Memory-based parallel data output controller
[NASA-CASE-GSC-12447-2] N83-29302

DECOMPOSITION
Development of a process to produce alcohol at paper mills
[DE83-009668] N83-29422
Environmental fate of hydrazine fuels in aqueous and soil environments
[AD-A125813] N83-29870

DECONDITIONING
Research opportunities in cardiovascular deconditioning, phase 1
[NASA-CR-3707] N83-29992

DEFECTS
Local defect arrays and properties of oxides
[AD-A125927] N83-29368
Characterization of material flaws using ultrasonic ramp responses
[DE83-006123] N83-29727
Stress intensity factor distribution for natural flaws grown under mode 1 loading using 3-d photoelasticity N83-29730

DEFENSE PROGRAM
Department of Defense in-house RDT and E (Research Development Test and Evaluation) activities
[AD-A125498] N83-30302

DEFLAGRATION
Pyrotechnic deflagration velocity and permeability
[DE82-014100] N83-29428

DEFORMATION
Nonequilibrium disclinations in the carbonaceous mesophase
[AD-A125807] N83-29395
Seismic energy absorption in simple structures
[PB83-143917] N83-29464
Influence of adhesive shear deformation on laminate structural behavior with application to parabolic trough solar collectors
[DE83-010293] N83-29838

DEGASSING
Degassifying and mixing apparatus for liquids --- potable water for spacecraft
[NASA-CASE-MSC-18936-1] N83-29652

DEGREES OF FREEDOM
Validation flight test of UH-60A for Rotorcraft Systems Integration Simulator (RSIS)
[AD-A125428] N83-29201

DEHYDRATION
Alcohol-Fuels Grant Program. Low-energy route for alcohol/gasohol recovery from fermentor beer
[DE83-009665] N83-29423

DEICING
Piezoelectric deicing device
[NASA-CASE-LEW-13773-1] N83-29197

DELAMINATING
Performance of a quantitative study of instability-related delamination growth
[NASA-CR-166046] N83-29314

DELIVERY
A minimal technology routing system
[AD-A126079] N83-30122

DELTA WINGS
A continuous vorticity panel method for the prediction of steady aerodynamic loads on lifting surfaces N83-29172
Numerical simulation of vortex breakdown by the vortex-filament method
[NASA-TM-84334] N83-29636

DEMODULATION
The generation of near millimeter radiation by picosecond pulse demodulation
[AD-A125510] N83-29576

DENSITY
The long term upper ocean study (LOTUS) cruise summary and hydrographic data report OCEANUS 119, May 1982
[AD-A125737] N83-29956

DENSITY DISTRIBUTION
Estimates of air-column density evolution behind strong airblasts
[DE82-018313] N83-29645
Folding models for elastic and inelastic scattering
[DE82-013458] N83-30189

DENSITY MEASUREMENT
Dye laser fluorescence spectroscopy on the doublet 3 Tokamak
[DE82-017575] N83-29338
Geodetic distance measuring apparatus
[NASA-CASE-GSC-12609-2] N83-29681

DEPLOYMENT
Development of deployable structures for large space platform systems, volume 2
[NASA-CR-170800] N83-29305

DEPOLARIZATION
Correlation of 6 and 4 GHz rain-induced depolarization at low elevation angle --- using INTELSAT satellites N83-29529

DEPOSITION
Dual tracer measurements of plume depletion
[DE83-005551] N83-29873
Acidity, nutrients and minerals in atmospheric precipitation over Florida: Deposition patterns, mechanisms and ecological effects
[PB83-165837] N83-29888

DESALINIZATION
Countercurrent reverse osmosis for ethanol-water separation
[DE83-009725] N83-29333

DESCRIPTIONS
An elementary approach to the six-port reflectometer, its theory and implementation
[DE82-015514] N83-30233

DESICCANTS
Development of a solar-desiccant dehumidifier, phase 2
[DE83-005407] N83-29829

DESIGN
Applications of composite gas-turbine components, phase 1
[DE83-006574] N83-29718

DESIGN ANALYSIS
Mechanical and thermal effects on the transient and steady state component performance of gas turbines N83-29252
International survey of the status of technology of critical components for coal-liquefaction processes
[DE82-015236] N83-29339
Protecting against failure by brittle fracture in ferritic-steel shipping containers greater than 4 inches thick
[DE83-007462] N83-29372
Transco medium-Btu coal gasification project. Executive summary
[DE82-009598] N83-29418
Development of alcohol-based synthetic transportation fuels from coal-derived synthesis gases
[DE83-004857] N83-29434
CAD of control systems: Application of nonlinear programming to a linear quadratic formulation
[NASA-CR-172151] N83-29448
Behavior and design of reinforced concrete column-type lapped splices subjected to high-intensity cyclic loading
[PB83-165134] N83-29474
Solar assisted gas-fired absorption heat pump
[PB83-167502] N83-29477
Phase 2B prototype redesign, tactical rubidium frequency standard
[AD-A126320] N83-29658
Elastomeric bearings design, construction and materials
[PB83-149211] N83-29723
Application of advanced reliability methods to local strain fatigue analysis
[NASA-CR-168198] N83-29734
Analytical design of multispectral sensors
[E83-10337] N83-29748
Establishment and furnishing of the Photovoltaic Center for the Southwest Residential Experiment Station
[DE82-904018] N83-29825
A composite-flywheel burst-containment study
[DE82-014138] N83-29865
Physical and engineering constraints for Tokamak reactors and helical coils
[DE82-019251] N83-30247

DESULFURIZING
Recovery of sulfur and accessory metals from a leaching process residue
[PB83-157651] N83-29383

DETECTION
Automatic recognition of mesocyclones from single Doppler radar data
[AD-A125854] N83-29929
Spatial and temporal visual masking and visibility
[AD-A125696] N83-30000
Workshop on Detection and Measurement of Pulmonary Oxygen Toxicity
[AD-A125821] N83-30003
Object detection by two-dimensional linear prediction
[AD-A126340] N83-30128

DETECTORS
Evaluation of in-package performance of antistatic materials
[AD-A126118] N83-29714
DETONATION
Three dimensional modeling of shock initiation of heterogeneous explosives
[DE82-006145] N83-29426
DETONATORS
Shock sensitivity of the explosive 2-(5-cyanotetrazolato) pentaamine cobalt(3) perchlorate (CP)
[DE82-013637] N83-29429
DEUTERIUM
Dye laser fluorescence spectroscopy on the doublet 3 Tokamak
[DE82-017575] N83-29338
DEUTERONS
The influence of the deviation from the equilibrium deuteron distribution on the neutron spectra in linear pinch geometries
[IPF-82-10] N83-30260
DEVELOPING NATIONS
Proceedings of the IFAC Symposium on Theory and Application of Digital Control. Volume 1: Discussion papers
[PB83-163923] N83-29677
Proceedings of the IFAC Symposium on Theory and Application of Digital Control. Volume 2: Discussion papers
[PB83-163931] N83-29678
DIAMONDS
Cutting with diamond wire: Cutting procedures and suggested uses N83-29447
DIATOMIC GASES
Kinetic studies of gas phase free radicals
[AD-A125516] N83-29688
DICHROISM
Circular differential scattering is an important part of the circular dichroism of macromolecules
[DE83-007022] N83-29405
DICTIONARIES
Functional specifications for a federal information processing standard data dictionary system
[PB83-169441] N83-30049
DIELECTRIC PROPERTIES
Testing to quantify the effects of handling of gas dielectric standard capacitors
[PB83-149385] N83-29624
DIELECTRICS
Numerical solution of equations describing electromagnetic propagation in dielectric tube waveguides
[NPL-DITC-16/83] N83-29487
EHF dielectric lens antenna for Satellite Communication Systems
[AD-A126214] N83-29578
Czechoslovak Journal of Physics (selected articles)
[AD-A126183] N83-30162
DIESEL ENGINES
Diesel exhaust-gas purification system
[DE82-019808] N83-29719
DIESEL FUELS
Emission characterization of a spark-ignited, heavy-duty, direct-injected methanol engine
[PB83-156372] N83-29722
DIETS
Chronic consumption of a low sodium diet: Hormonal and physiological effects during exercise in the heat
[AD-A124936] N83-29997
DIFFERENCE EQUATIONS
A recursive estimator and stability of a class of time varying difference equations
[PB83-167213] N83-30138
DIFFERENTIAL EQUATIONS
N-person differential games. Part 2: The penalty method
[NASA-CR-166111] N83-30106
Legendre-Tau approximations for functional differential equations
[NASA-CR-172155] N83-30108
Multirate linear multistep methods for the solution of systems of ordinary differential equations
[DE83-004259] N83-30135
Global-error estimation for stiff ODEs
[DE83-006846] N83-30136
DIFFRACTION PATHS
Radar modeling of space diversity associated with slant path rain attenuation at variable path angles, frequencies, and drop size distributions N83-29551
Focusing and imaging sharp line X-ray and gamma-ray sources using variable-metric diffraction crystals
[DE83-007789] N83-30285
DIFFRACTION PATTERNS
Standard X-ray diffraction power patterns. Section 19: Data for 51 substances
[PB83-164962] N83-30292
DIFFUSION
Oxygen diffusion of anodic surface oxide film on titanium studied by Auger electron spectroscopy
[DE82-013653] N83-29340
Basic studies of gases for fast switches
[AD-A126343] N83-29618
Dual tracer measurements of plume depletion
[DE83-005551] N83-29873
Stability analysis of finite difference schemes for the advection-diffusion equation
[NASA-CR-172823] N83-30123
Grain-boudary-diffusion mechanisms in metals
[DE82-018814] N83-30280
DIFFUSION FLAMES
Studies of dry-powder extinguishment of diffusion flames for condensed fuels
[PB83-150656] N83-29348
Proceedings of the Fifth Fundamental Combustion Research Contractors Workshop
[PB83-164483] N83-29349
DIFFUSIVITY
Modeling of fluctuating mass flux in variable density flows N83-29224
Characterization of tar products from rapid pyrolysis of bituminous coals
[DE83-007272] N83-29346
Characteristics of the transmission loss apparatus at NASA Langley Research Center
[NASA-CR-172153] N83-30165
DIGITAL COMPUTERS
Electronic equipment in multiple access information systems
[AD-A126169] N83-29612
Proceedings of the IFAC Symposium on Theory and Application of Digital Control. Volume 1: Discussion papers
[PB83-163923] N83-29677
Proceedings of the IFAC Symposium on Theory and Application of Digital Control. Volume 2: Discussion papers
[PB83-163931] N83-29678
Leadless chip carrier packaging and CAD/CAM (Computer-Aided Design/Computer-Aided Manufacturing) supported wire wrap interconnect technology for subnanosecond ECL (Emitter Coupled Logic)
[AD-A126156] N83-30277
DIGITAL DATA
Memory-based parallel data output controller
[NASA-CASE-GSC-12447-2] N83-29302
Proceedings of the IFAC Symposium on Theory and Application of Digital Control. Volume 1: Discussion papers
[PB83-163923] N83-29677
Proceedings of the IFAC Symposium on Theory and Application of Digital Control. Volume 2: Discussion papers
[PB83-163931] N83-29678
LANDSAT imagery: Description of products available from the CSIR Satellite Remote Sensing Centre
[E83-10354] N83-29752
Three-dimensional perspective software for representation of digital imagery data — Olympic National Park, Washington
[E83-10359] N83-29770
Computer implemented land cover classification using LANDSAT MSS digital data: A cooperative research project between the National Park Service and NASA. 3: Vegetation and other land cover analysis of Shenandoah National Park
[E83-10362] N83-29773
Satellite freeze forecast system: Executive summary
[E83-10368] N83-29778
Processing of digital ionograms
[AD-A125831] N83-30065
DIGITAL FILTERS
Multi-dimensional signal procesing research program
[AD-A126333] N83-29580
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172904] N83-30060
DIGITAL NAVIGATION
Development and evaluation of a Kalman-filter algorithm for terminal area navigation using sensors of moderate accuracy
[NASA-TP-2035] N83-29193
DIGITAL SIMULATION
Generalized digital simulation technique with variable engine parameter input for steady state and transient behaviour of aero gas turbines N83-29263
Computer simulation and control of underwater vehicles
[PB83-150532] N83-29462
DIGITAL SYSTEMS
Potential benefits of a Full Authority Digital Electronic Control (FADEC) installed on a TF30 engine in an F14 flight test demonstrator aircraft N83-29269
Antenna digital control for the Directed Mirror Antenna Radar (DMAR)
[AD-A125812] N83-29585
Design of a high-speed digital processing element for parallel simulation
[NASA-TM-83373] N83-29597
Automatic scaling of digisonde ionograms test and evaluation report
[AD-A125830] N83-30064
Processing of digital ionograms
[AD-A125831] N83-30065
On the characterization of simple closed surfaces in 3-dimensional digital images
[AD-A125573] N83-30116
DIGITAL TO ANALOG CONVERTERS
Memory-based parallel data output controller
[NASA-CASE-GSC-12447-2] N83-29302
DIMENSIONS
Display-control compatibility in 3-D displays. 2: Effects of cue symmetry
[AD-A125806] N83-30036
DIMETHYLHYDRAZINES
Environmental fate of hydrazine fuels in aqueous and soil environments
[AD-A125813] N83-29870
DIPOLE MOMENTS
Third order polarization for multifrequency coherent anti-Stokes Raman scattering
[AD-A125434] N83-29330
International Catalog of Geomagnetic Data
[PB83-161679] N83-29921
DISCRIMINATION
Brain responses and information processing 3: Hemispheric asymmetry in event related potentials and performance during discrimination of line orientation and velocity of motion
[AD-A125681] N83-30011
DISKS (SHAPES)
Full-scale turbine-missile-casing tests
[DE83-007427] N83-29310
DISPERSIONS
Wave propagation in precipitation N83-29496
Dispersion in fracture networks
[DE83-005584] N83-29913
DISPLACEMENT
The matrix of axial and radial plays: The present situation and perspectives — turbojet engines N83-29253
A theoretical analysis of the observed calcium anomalies concomitant with the interaction of low intensity electric fields with cerebral tissue
[AD-A126284] N83-29996
DISPLAY DEVICES
The 5th Advanced Aircrew Display Symposium Proceedings
[AD-A126132] N83-29206
Integrated circuits for optical sensing and display techniques
[BMFT-FB-T-83-052] N83-29622
Display-control compatibility in 3-D displays. 2: Effects of cue symmetry
[AD-A125806] N83-30036
Voice control of an unmanned submersible
[AD-A125523] N83-30039
Requirements for natural language understanding in a system with graphic displays
[AD-A126065] N83-30072
Thoughts on the evolution of dynamic graphics
[DE83-006146] N83-30084
Nematic liquid crystals for display systems
[BMFT-FB-T-83-004] N83-30286
Display subsystems with liquid crystals
[BMFT-FB-T-83-047] N83-30289
DISSOLVED GASES
Gas/liquid separation in transient flow preproject
[PB83-171041] N83-29352
DISTANCE MEASURING EQUIPMENT
Geodetic distance measuring apparatus
[NASA-CASE-GSC-12609-2] N83-29681
DISTILLATION
Identification and comparative genotoxicity of polycyclic aromatic hydrocarbons and related nitrogen-containing heteroatomic species in products from coal liquefaction processes
[DE83-006939] N83-29312
Countercurrent reverse osmosis for ethanol-water separation
[DE83-009725] N83-29333
Alcohol-Fuels Grant Program. Low-energy route for alcohol/gasohol recovery from fermentor beer
[DE83-009665] N83-29423
DISTORTION
Test facility for basic research on distortion N83-29258
DISTRIBUTED PROCESSING
Distributed decision making environment
[AD-A126021] N83-30099

Total System Design (TSD) methodology assessment
[AD-A126101] N83-30158
DISTRIBUTION FUNCTIONS
Theoretical results for starved elliptical contacts
[NASA-TM-81697] N83-29710
On the variance of probability estimates with correlated data
[AD-A126336] N83-30153
Hot-electron distribution function in high-Z materials
[DE82-008109] N83-30282
DIVING (UNDERWATER)
Workshop on Detection and Measurement of Pulmonary Oxygen Toxicity
[AD-A125821] N83-30003
DOCUMENTATION
Functional specifications for a federal information processing standard data dictionary system
[PB83-169441] N83-30049
Classification systems in information and documentation. Possibilities of further development
[BMFT-FB-ID-83-003] N83-30314
Notes for medical catalogers, 1982
[PB83-170860] N83-30317
DOMESTIC ENERGY
Solar project description. Houston Construction Company single family residence, Eden Prairie, Minnesota March 19, 1982
[DE82-012337] N83-29456
DOORS
Adaptation of pultrusion to the manufacture of helicopter components
[AD-A126291] N83-29171
DOPPLER EFFECT
Ultrasonic imaging development
[PB83-155994] N83-30007
DOPPLER RADAR
Capability of surface-based clear-air Doppler radar for monitoring meteorological properties in elevated layers N83-29549
Automatic recognition of mesocyclones from single Doppler radar data
[AD-A125854] N83-29929
DOSIMETERS
Los Alamos portable beta-ray spectrometer
[DE83-007575] N83-29667
DOWNLINKING
An offsetting technique to study oscillations in direction of arrival in Earth-space paths N83-29509
DRAG COEFFICIENTS
The drag of a circular cylinder on or near a flat plat appropriate for ship-model turbulence stimulators
[AD-A126155] N83-29638
DRILLING
Diesel exhaust-gas purification system
[DE82-019808] N83-29719
Analysis of the internal point load test
[PB83-164566] N83-29919
DRINKING
Preconcentration methods for trace element determination
[PB83-172536] N83-29351
DROP SIZE
Measurements and analysis of raindrop size distribution in south western Nigeria N83-29518
DROPS (LIQUIDS)
Numerical simulation for droplet combustion using Lagrangian hydrodynamics N83-29210
Structure of evaporating and combusting sprays: Measurements and predictions N83-29211
Fuel spray diagnostics N83-29212
Effect of liquid droplets on turbulence structure in a round gaseous jet N83-29215
Spray impaction, retention and adhesion: An introduction to basis characteristics
[CA-8215] N83-29394
DRUMS (CONTAINERS)
Analysis, scale modeling, and full-scale tests of low-level nuclear-waste-drum response to accident environments
[DE83-007587] N83-30217
DUST
Some X-band measurements of the dielectric constant of dust N83-29514
DUST STORMS
Effects of dust/sandstorm on some aspects of microwave propagation N83-29516
DYE LASERS
Spectroscopic properties of metal monoxides and hydroxides important in the ionosphere
[AD-A126332] N83-29905
DYNAMIC CHARACTERISTICS
Computer simulation and control of underwater vehicles
[PB83-150532] N83-29462
DIDA: Dynamic Image Disparity Analysis
[AD-A126327] N83-30080
DYNAMIC MODELS
Analytical calculation of a single jet in cross-flow and comparison with experiment N83-29219
Improvements in the dynamic simulation of gas turbines N83-29264
Techniques for determining engine stall recovery characteristics N83-29265
DYNAMIC PRESSURE
Dynamic-pressure measurements using an electronically scanned pressure module
[NASA-TM-84650] N83-29655
DYNAMIC RESPONSE
Airworthiness and Flight Characteristics test (A&FC) of AH-1S with Aircraft General Purpose Dispenser System (AGPDS)
[AD-A125978] N83-29199
An overview of engine dynamic response and mathematical modeling concepts N83-29262
Techniques for determining engine stall recovery characteristics N83-29265
Effects of variation in load history on cyclic response of concrete flexural members
[PB83-153403] N83-29741
DYNAMIC STABILITY
Designing for stability in advanced turbine engines N83-29266

E

EARTH (PLANET)
A simple derivation of the formula to calculated synthetic long-period seismograms in a heterogeneous Earth by normal mode summation
[NASA-CR-172818] N83-29893
EARTH ATMOSPHERE
Dynamics of ocean and atmosphere on basis of observations from Salyut-6 N83-29286
EARTH CORE
Theories of nutation and polar motion III
[AD-A126289] N83-29902
EARTH CRUST
Electromagnetic deep-probing (100-1000 kms) of the Earth's interior from artificial satellites: Constraints on the regional emplacement of crustal resources
[E83-10363] N83-29774
Japanese MAGSAT team
[E83-10366] N83-29777
Reports on crustal movements and deformations --- bibliography
[NASA-TM-85041] N83-29894
EARTH MOVEMENTS
Seismological discrimination and yield determination research
[AD-A126002] N83-29896
Theories of nutation and polar motion III
[AD-A126289] N83-29902
Advanced seismological research and improved yield determination
[AD-A125508] N83-29903
Plate tectonic behaviour in the east Mediterranean region to be detected by baseline variations from satellite laser ranging
[PB83-159772] N83-29920
EARTH OBSERVATIONS (FROM SPACE)
Dynamics of ocean and atmosphere on basis of observations from Salyut-6 N83-29286
EARTH RESOURCES
Reference marker: Photopoint resources management system
[PB83-163345] N83-29467
On electromagnetic methods in geophysical probing N83-29547
Response of a layer to sinusoidal or impulsive electromagnetic excitation: Approximation of the thin plate --- Earth resource exploration N83-29548
EARTH SURFACE
Interactive analysis of digital terrain elevation and surface feature data bases
[AD-A126310] N83-29784
EARTHQUAKE RESISTANT STRUCTURES
States of the art and practice in the optimum seismic design and analytical response prediction of r/c frame-wall structures
[PB83-147736] N83-29465
Effects of variation in load history on cyclic response of concrete flexural members
[PB83-153403] N83-29741
Mechanical behavior of shear wall vertical boundary members: An experimental investigation
[PB83-159764] N83-29742
EARTHQUAKES
Seismic energy absorption in simple structures
[PB83-143917] N83-29464
An evaluation of the design and analytical seismic response of a seven-story reinforced concrete frame-wall structure
[PB83-157628] N83-29470
A data memory system for a seafloor-earthquake-measuring instrument
[DE82-016808] N83-29665
Investigation of the conservatism associated with different combinations between primary and secondary piping responses
[DE83-007417] N83-29740
Advanced seismological research and improved yield determination
[AD-A126001] N83-29895
Advanced seismological research and improved yield determination
[AD-A125508] N83-29903
Correlation between precision gravity and subsidence measurements at Cerro Prieto
[DE83-005870] N83-29907
Earthquakes and earthquake predictions: Simulating their economic effects
[PB83-163725] N83-29939
ECOLOGY
A perspective on the role of microcosms in environmental fate and effects assessments
[PB83-165530] N83-29889
Mississippi Deltaic Plain Region ecological characterization: An ecological atlas. Map narratives
[PB83-157669] N83-29890
Problems of studying the biological effect of electromagnetic fields discussed N83-29976
Some issues in comparability of results and analytical methodology in CELSS waste processing research N83-30031
ECONOMETRICS
Evaluation of the ORNL residential energy-use model
[DE82-905768] N83-29820
ECONOMIC ANALYSIS
Earthquakes and earthquake predictions: Simulating their economic effects
[PB83-163725] N83-29939
A Workshop on Alternative Fusion Concepts and Their Utilization Projections
[PB83-157966] N83-30263
ECONOMIC IMPACT
Increased automobile fuel efficiency and synthetic fuels. Alternatives for reducing oil imports. Background paper 5: Water availability for synthetic fuels: An assessment of current studies
[PB83-152645] N83-29437
Pulse combustion residential water heater
[PB83-167221] N83-29480
ECONOMICS
Contribution of space program to national economy N83-29289
Manufacturing and cost analyses of heliostats based on the second-generation heliostat-development study
[DE83-006664] N83-29835
ECOSYSTEMS
Remote sensing investigations of wetland biomass and productivity for global biosystems research N83-29767
Vegetational analysis of a canyon ecosystem at Los Alamos
[DE83-008277] N83-29878
A perspective on the role of microcosms in environmental fate and effects assessments
[PB83-165530] N83-29889
Control problems in autonomous life support systems N83-30020
EDDY CURRENTS
Research to develop and evaluate advanced eddy current sensors for detecting small flaws in metallic aerospace components
[AD-A125873] N83-29726
EDGES
Matching edges in maps and aerial images using the chamfer matching algorithm
[FOA-C-30315-E1] N83-29791
EDUCATION
Local governments LANDSAT applications program
[E83-10364] N83-29775
Informational technology and its impact on American education
[PB83-174664] N83-30296
Scientific communication and national security
[PB83-157800] N83-30320
EFFICIENCY
Small transport aircraft technology propeller study
[NASA-CR-166045] N83-29178
Warm air systems. Part 1: Temperatures and temperature efficiencies
[PB83-148908] N83-29484
Warm air systems. Part 2: Tracer gas measurements and ventilation efficiencies
[PB83-148916] N83-29485

Intermediate photovoltaic system application experiment operational performance report for G. N. Wilcox Memorial Hospital, Kauai, Hawaii for October 1982, volume 6
[DE83-006415] N83-29834
Solar storage for process heat and building application: A review of prior assessments
[DE82-019791] N83-29857
Representation of multivariate functions
[AD-A125898] N83-30132

EGYPT
Prediction of rain attenuation based on point rain rate statistics for Alexandria, Egypt N83-29525

EIGENVALUES
Numerical solution of equations describing electromagnetic propagation in dielectric tube waveguides
[NPL-DITC-16/83] N83-29487

EKMAN LAYER
Frictional secondary circulation near an upwelled thermocline
[PB83-162024] N83-29965

ELASTIC CYLINDERS
Computation of propagation speed and reflection of axially symmetric waves in composite cylinders with application to impedance tube and calibrator
[AD-A125875] N83-29320

ELASTIC DEFORMATION
Propagation elastic-plastic fields: Asymptotic analysis of plane strain crack growth and restrictions on moving surfaces of strong discontinuity
[DE82-018820] N83-29737

ELASTIC PROPERTIES
The effect of extreme temperatures on the elastic properties and fracture behavior of graphite/polyimide composites
[NASA-CR-172143] N83-29315
An evaluation of the design and analytical seismic response of a seven-story reinforced concrete frame-wall structure
[PB83-157628] N83-29470
Characterization of material flaws using ultrasonic ramp responses
[DE83-006123] N83-29727

ELASTIC SCATTERING
Folding models for elastic and inelastic scattering
[DE82-013458] N83-30189
Particle physics experiments, 1981
[PB83-164715] N83-30207
Polarized E + - polarized p colliding beams: Physics issues
[DE83-006645] N83-30295

ELASTIC WAVES
Scatter of elastic waves by a thin flat elliptical inhomogeneity
[NASA-CR-3705] N83-29725
Vibroseismic excitation of elastic waves in a semi-infinite solid
[PB83-165365] N83-29916

ELASTODYNAMICS
Scatter of elastic waves by a thin flat elliptical inhomogeneity
[NASA-CR-3705] N83-29725

ELASTOHYDRODYNAMICS
Theoretical results for starved elliptical contacts
[NASA-TM-81697] N83-29710
Experimental investigations of elastohydrodynamic lubrication
[NASA-TM-81698] N83-29711
Elastohydrodynamics of elliptical contacts for materials of low elastic modulus
[NASA-TM-81699] N83-29712
Applications of film thickness equations
[NASA-TM-81701] N83-29713

ELASTOMERS
Synthesis and characterization of a new silicone multiblock polymer
[DE82-015189] N83-29406
Elastomeric bearings design, construction and materials
[PB83-149211] N83-29723

ELECTRIC ARCS
Current density in cathode spots in the condensed discharge
[AD-A126221] N83-29601

ELECTRIC BATTERIES
NASA Redox Project status summary
[NASA-TM-83401] N83-29810
Material problems in lithium, ambient-temperature, primary batteries
[DE82-010083] N83-29860
Present development status of Exxon's zinc-bromine battery for bulk energy storage
[DE82-013642] N83-29862

ELECTRIC BRIDGES
Electrothermal response testing: A component development tool
[DE82-012694] N83-29617

ELECTRIC CONNECTORS
Electrical self-aligning connector
[NASA-CASE-MFS-25211-2] N83-29592
Restructurable VLSI program
[AD-A126216] N83-29611

ELECTRIC CORONA
Investigations of other operating points for the RCA streak tube in the Lawrence Livermore National Laboratory streak camera
[DE82-019065] N83-29663

ELECTRIC CURRENT
Infrared detection of microwave induced surface currents on flat plates
[AD-A126207] N83-30227

ELECTRIC DIPOLES
Nuclear structure in pion scattering and charge exchange
[DE83-007945] N83-30205

ELECTRIC DISCHARGES
Current density in cathode spots in the condensed discharge
[AD-A126221] N83-29601
Czechoslovak Journal of Physics (selected articles)
[AD-A126183] N83-30162

ELECTRIC FIELDS
Third order polarization for multifrequency coherent anti-Stokes Raman scattering
[AD-A125434] N83-29330
A note on beamforming algorithms
[AD-A126275] N83-29564

ELECTRIC GENERATORS
Magnetization of rare earth/cobalt permanent magnets subsequent to assembly in complex rotor structures
[AD-A126322] N83-30163

ELECTRIC MOTOR VEHICLES
Electrochemistry of fuel cells for transportation applications
[DE82-008115] N83-29819
Metal-air battery research and development
[DE82-019881] N83-29864

ELECTRIC MOTORS
Objective acoustic quality inspection by pattern recognition and signal analysis. Design of an inspection system and application to an electric motor
[BMFT-FB-T-83-005] N83-29619

ELECTRIC POWER PLANTS
Crosbyton Solar Power Project. Volume 8: Preliminary design of 55-MWe solar-fossil hybrid electric power plant at Crosbyton, Texas
[DE83-005285] N83-29832
OTEC plants for todays island market
[DE83-008670] N83-29847
Increasing the efficiency of coal-fired power plants by means of a transition to maximum steam conditions
[BMFT-FB-T-83-033] N83-29869
Airborne field study of power plant plume dispersion in stable atmospheres
[PB83-168930] N83-29887
Task 4 completion report for 40 Kilowatt grid connected modification contract
[NASA-CR-167950] N83-30297

ELECTRIC POWER SUPPLIES
High voltage power supply
[NASA-CASE-GSC-12818-1] N83-29594

ELECTRIC PULSES
Electrothermal response testing: A component development tool
[DE82-012694] N83-29617

ELECTRIC SPARKS
High voltage isolation transformer
[NASA-CASE-GSC-12817-1] N83-29590

ELECTRIC SWITCHES
Restructurable VLSI program
[AD-A126216] N83-29611

ELECTRICAL FAULTS
Design-dependent variability of pulse hardness of types of discrete semiconductor devices (intervendor variations)
[AD-A125776] N83-29560

ELECTRICAL PROPERTIES
Local defect arrays and properties of oxides
[AD-A125927] N83-29368
Cross-linking reactions of thermally stable high performance polymers
[AD-A125967] N83-29397
Design and development of multi-kW power electronic transformers --- for long duration space applications
[NASA-CR-168082] N83-29596

ELECTRICAL RESISTIVITY
High voltage isolation transformer
[NASA-CASE-GSC-12817-1] N83-29590

ELECTRO-OPTICS
USAF (United States Air Force) avionics master plan
[AD-A125819] N83-29205

ELECTROACOUSTIC WAVES
Carbon granule probe microphone for leak detection
[NASA-CASE-NPO-16027-1] N83-29595

ELECTROCATALYSTS
Chemical modification of carbon electrodes
[AD-A125964] N83-29327

ELECTROCHEMISTRY
Chemical modification of carbon electrodes
[AD-A125964] N83-29327
NASA Redox Project status summary
[NASA-TM-83401] N83-29810
Electrochemistry of fuel cells for transportation applications
[DE82-008115] N83-29819
Maintenance-free 100 ampere-hour, lead acid battery for deep discharge, photovoltaic applications
[DE82-018633] N83-29821

ELECTRODES
A spillage detector for liquid chromatography systems
[NASA-CASE-MSC-20206-1] N83-29325
Chemical modification of carbon electrodes
[AD-A125964] N83-29327
Removal of hydrogen from plated high strength steel by baking: A statistically designed study
[AD-A126100] N83-29366
A microscopic model for the liquid metal: Ionic solution interface
[AD-A125531] N83-29367

ELECTROLUMINESCENCE
A field visibility comparison between electroluminescent sources and standard US Coast Guard incandescent aids-to-navigation sources
[AD-A125575] N83-30223

ELECTROLYSIS
Recovery of sulfur and accessory metals from a leaching process residue
[PB83-157651] N83-29383

ELECTROLYTES
Palladium electrolytes for use in selective plating processes
[BMFT-FB-T-83-024] N83-29376
Polyvinyl alcohol battery separator containing inert filler
[NASA-CASE-LEW-13556-2] N83-29805
Flowing-electrolyte-battery testing and evaluation
[DE82-015258] N83-29861
Czechoslovak Journal of Physics (selected articles)
[AD-A126183] N83-30162

ELECTROMAGNETIC FIELDS
Spray impaction, retention and adhesion: An introduction to basis characteristics
[CA-8215] N83-29394
Induction heating gun
[NASA-CASE-LAR-13181-1] N83-29591
Electromagnetic surface fields due to a magnetic dipole buried in a three-layered Earth. Report of investigations, 1982
[PB83-148064] N83-29799
Effect of low-intensity superhigh-frequency energy on respiration and oxidative phosphorylation of organ mitochondria and activity of some blood enzymes N83-29975
Problems of studying the biological effect of electromagnetic fields discussed N83-29976
Local use of microwave electromagnetic energy on biologically active points N83-29978
State of hepatic circulation in response to combined effect of lead and electromagnetic fields N83-29982
Action of industrial frequency electric field on indicators of natural immunity N83-29984

ELECTROMAGNETIC INTERACTIONS
A theoretical analysis of the observed calcium anomalies concomitant with the interaction of low intensity electric fields with cerebral tissue
[AD-A126284] N83-29996

ELECTROMAGNETIC INTERFERENCE
EMI from solar panels and inverters
[DE83-006028] N83-29833
Fiber optics in aircraft applications
[AD-A126165] N83-30230

ELECTROMAGNETIC MEASUREMENT
Electromagnetic deep-probing (100-1000 kms) of the Earth's interior from artificial satellites: Constraints on the regional emplacement of crustal resources
[E83-10363] N83-29774

ELECTROMAGNETIC PULSES
Response of a layer to sinusoidal or impulsive electromagnetic excitation: Approximation of the thin plate --- Earth resource exploration N83-29548
Design-dependent variability of pulse hardness of types of discrete semiconductor devices (intervendor variations)
[AD-A125776] N83-29560

The generation of near millimeter radiation by picosecond pulse demodulation
[AD-A125510] N83-29576
Design of neutron streak camera for fusion diagnostics
[DE82-018393] N83-29662
Theoretical modeling of EMP effects in semiconductor junction devices
[AD-A125976] N83-30273

ELECTROMAGNETIC RADIATION
Wave propagation and remote sensing N83-29495
Wave propagation in precipitation N83-29496
EMI from solar panels and inverters
[DE83-006028] N83-29833
USSR report: Life sciences. Effects of nonionizing electromagnetic radiation, no. 10
[JPRS-83745] N83-29973
Autoallergic effects of microwave electromagnetic energy and their influence on the fetus and offspring N83-29974
Dependence of biological effects of microwave irradiation on exposure intensity and duration N83-29980
Metabolism of the brain and liver after experimental exposure to super high-frequency fields of non-thermal intensity N83-29981
Morphological changes in neurons of the central nervous system in response to experimental influence of centimeter-range electromagnetic waves on the body N83-29983
Summary of rules for sampling, decimation, and interpolation of experimental data
[DE82-016360] N83-30313

ELECTROMAGNETIC SCATTERING
The development and testing of a stochastic variational principle for electromagnetic scattering N83-29535
A new perturbation expansion for electromagnetic scattering by stochastic surfaces N83-29536
Scattering and absorption by atmospheric aerosol models N83-29542
Scattering by spheroidal and rough particles
[AD-A125767] N83-29558

ELECTROMAGNETIC WAVE TRANSMISSION
Numerical solution of equations describing electromagnetic propagation in dielectric tube waveguides
[NPL-DITC-16/83] N83-29487
Electromagnetic surface fields due to a magnetic dipole buried in a three-layered Earth. Report of investigations, 1982
[PB83-148064] N83-29799

ELECTRON ACCELERATION
Ion acceleration in the plasma focus
[IPF-82-6] N83-30257

ELECTRON BEAM WELDING
Microfissuring of Inconel 718
[NASA-TM-82531] N83-29356

ELECTRON BEAMS
Theory of cusptron microwave tubes
[AD-A126116] N83-29605
Basic studies of gases for fast switches
[AD-A126343] N83-29618
Design of neutron streak camera for fusion diagnostics
[DE82-018393] N83-29662
The axisymmetric instability of a self-pinched beam with a rounded radial density profile
[AD-A126117] N83-30178

ELECTRON CYCLOTRON HEATING
Beta increase in a belt pinch plasma by fast magnetosonic wave heating
[IPF-82-11] N83-30261

ELECTRON DENSITY (CONCENTRATION)
Coordinated ground-based measurements at Chatanika: Auroral spatial and temporal structures
[AD-A126113] N83-29900
UV emissions and the electron density in the auroral and low to mid-latitude daytime ionospheres
[AD-A126318] N83-29901
Creation of high energy electron tails due to the modified 2-stream instability
[NASA-CR-172819] N83-30171
Studying electron distributions using the time-resolved free-bound spectra from coronal plasmas
[DE83-006569] N83-30241
Time-resolved X-ray line diagnostics of laser-produced plasmas
[DE82-015165] N83-30249
Theory of runaway-current sustainment by lower-hybrid waves
[DE82-017213] N83-30254

ELECTRON DENSITY PROFILES
The computer data-acquisition and control system for Thomson-scattering measurements
[DE83-008167] N83-30097
Wavelength scaling of the two-plasmon decay and stimulated Raman-scattering instabilities
[DE83-007905] N83-30202

ELECTRON DISTRIBUTION
Theory of current drive with lower hybrid waves
[DE82-017216] N83-30243

ELECTRON ENERGY
The computer data-acquisition and control system for Thomson-scattering measurements
[DE83-008167] N83-30097
Creation of high energy electron tails due to the modified 2-stream instability
[NASA-CR-172819] N83-30171
Neutral-particle-beam production and injection
[DE83-006966] N83-30201
Time-resolved X-ray line diagnostics of laser-produced plasmas
[DE82-015165] N83-30249

ELECTRON GAS
A review of quantum Monte Carlo methods and results for Coulombic systems
[DE83-006570] N83-30155

ELECTRON MICROSCOPES
Radiation-induced microstructural changes in Ni-C and Pt-C alloys
[DE83-007815] N83-29371
Thermionic-emission microscopy of polycrystalline molybdenum and Mo-LaCrO-3
[DE83-006596] N83-30284

ELECTRON MICROSCOPY
A fundamental study of tool steels processed from rapidly solidified powders
[AD-A126163] N83-29362
SEM (Scanning-Electron-Microscopy) studies of magnetic domains in amorphous metals
[AD-A126070] N83-29365
Methods of submicron analysis as assistance for semiconductor technology
[BMFT-FB-T-83-032] N83-30288

ELECTRON MOBILITY
Experimental studies of lateral electron transport in gallium arsenide-aluminum gallium arsenide heterostructures
[AD-A125858] N83-30275

ELECTRON RUNAWAY (PLASMA PHYSICS)
Theory of runaway-current sustainment by lower-hybrid waves
[DE82-017213] N83-30254

ELECTRON SCATTERING
Electronic isotope shifts muonic atoms and electron scattering
[DE82-014040] N83-30194
Self-consistent electron transport in collisional plasmas
[DE82-014083] N83-30244
Laser-fluorescence measurements of hydrogen and metal densities in the doublet 3 Tokamak
[DE83-008499] N83-30251

ELECTRON STATES
Spectroscopic studies of the electronic structure of metal-semiconductor and vacuum-semiconductor interfaces
[AD-A125621] N83-30272

ELECTRON TUNNELING
Superconducting niobium thin-film gradiometer technology program
[AD-A126133] N83-29656
Relations between the simultaneous and sequential transfer of 2 nucleons
[DE82-017425] N83-30190
Probing the nuclear structure with heavy-ion reactions
[DE82-017316] N83-30195

ELECTRONIC CONTROL
Potential benefits of a Full Authority Digital Electronic Control (FADEC) installed on a TF30 engine in an F14 flight test demonstrator aircraft N83-29269
Toward a metrology for precision-machine-tool control systems
[DE82-018077] N83-29458
Integrated optical transmitter and receiver
[AD-A125493] N83-29575

ELECTRONIC EQUIPMENT
Report of the 67th National Conference on Weights and Measures 1982
[PB83-167148] N83-29473
Pressure altitude tests of the Army AN/MSQ-114 control terminal
[AD-A125524] N83-29572
Design and development of multi-kW power electronic transformers --- for long duration space applications
[NASA-CR-168082] N83-29596

ELECTRONIC PACKAGING
Semiconductor measurement technology: Graphical solution for the helium leak detector and radioisotope methods of hermetic test, master graphs and instructions
[PB83-146845] N83-29672
Evaluation of in-package performance of antistatic materials
[AD-A126118] N83-29714

ELECTRONIC WARFARE
USAF (United States Air Force) avionics master plan
[AD-A125819] N83-29205

ELECTROPLATING
Palladium electrolytes for use in selective plating processes
[BMFT-FB-T-83-024] N83-29376
Method of forming oxide coatings --- for solar collector heating panels
[NASA-CASE-LEW-13132-1] N83-29388

ELECTROSTATIC CHARGE
Evaluation of in-package performance of antistatic materials
[AD-A126118] N83-29714

ELECTROSTATIC SHIELDING
High voltage isolation transformer
[NASA-CASE-GSC-12817-1] N83-29590

ELECTROSTATICS
FSA field test report, 1980 - 1982
[NASA-CR-172863] N83-29808

ELEMENTARY PARTICLE INTERACTIONS
Rare kaon decays at LAMPF 2
[DE82-019191] N83-30187

ELEVATION
Soil temperature investigations using satellite acquired thermal-infrared data in semi-arid regions --- Utah
[E83-10355] N83-29753

ELLIPSES
Theoretical results for starved elliptical contacts
[NASA-TM-81697] N83-29710

ELLIPTIC DIFFERENTIAL EQUATIONS
Numerical solution of a coupled pair of elliptic equations from solid state electronics
[NASA-CR-172128] N83-30109
Multi-gold algorithms with applications to elliptic boundary-value problems
[AD-A125769] N83-30114

ELLIPTIC FUNCTIONS
Algorithms and data structures for adaptive multigrid elliptic solvers
[NASA-CR-172158] N83-30056
A compact finite difference scheme for div(Rho grad u) - q2u = 0
[NASA-CR-172165] N83-30112
Development of the GEM (General Elliptic Marching) package: User-oriented codes for general discretized elliptic and mixed partial differential equations
[AD-A125897] N83-30131

ELLIPTICITY
Elastohydrodynamics of elliptical contacts for materials of low elastic modulus
[NASA-TM-81699] N83-29712
Scatter of elastic waves by a thin flat elliptical inhomogeneity
[NASA-CR-3705] N83-29725

EMERGENCIES
Emergency Medical Service (EMS): Rotorcraft Technology Workshop
[NASA-CR-166495] N83-30325

EMERGENCY LOCATOR TRANSMITTERS
Satellite orbit predictor
[NASA-TM-85015] N83-29293
Minimum operational performance standards for emergency locator transmitters. Automatic fixed, ELT (AF); automatic portable, ELT (AP); automatic deployable, ELT (AD); survival, ELT (S) operating on 121.5 and 243.0 megahertz
[RTCA/DO-183] N83-29488

EMISSION
Summary of status of Environmental Protection Agency (EPA), Office of Mobile Sources Characterization Projects as of March, 1982
[PB83-163972] N83-29441
VOC (Volatile Organic Compound) fugitive emissions in petroleum refining industry: Background information for proposed standards
[PB83-157743] N83-29885

EMISSION SPECTRA
New pulsed far infrared laser lines in D2O
[IPF-82-13] N83-29701
Spatially and spectraly resolved filamentary structures in the (3/2)omega 0 emission from laser produced plasmas
[PB83-165969] N83-30264

Detailed observations of NGC 4151 with IUE (International Ultraviolet Explorer). Paper 2: Variability of the continuum from 1978 February to 1980 May, including X-ray and optical observations
[PB83-164947] N83-30338
Infrared molecular emissions from comets
[NASA-TM-85067] N83-30344

ENCAPSULATING
Applications of ethylene vinyl acetate as an encapsulation material for terrestrial photovoltaic modules
[NASA-CR-172862] N83-29809

ENCLOSURES
Energy transport in porous-insulator systems. 2: Performance of vertical enclosures
[DE82-019894] N83-29643

ENERGY ABSORPTION
Full-scale turbine-missile-casing tests
[DE83-007427] N83-29310
Seismic energy absorption in simple structures
[PB83-143917] N83-29464

ENERGY CONSERVATION
Proceedings of a National Seminar on Energy Challenge of the Eighties
[PB83-164764] N83-29442
Experimental polyurethane foam roof systems, part 2
[AD-A126315] N83-29453
Direct enzymatic extraction of starch from corn as an energy-saving alternative to production of high-fructose syrup
[DE82-008314] N83-29822
Establishment and furnishing of the Photovoltaic Center for the Southwest Residential Experiment Station
[DE82-904018] N83-29825
Measured performance results: Low-cost solar water heating systems in the San Luis Valley
[DE83-006488] N83-29831
Solar storage for process heat and building application: A review of prior assessments
[DE82-019791] N83-29857

ENERGY CONSUMPTION
Low-energy process to extract anhydrous ethanol from fermentation beers
[DE83-005012] N83-29419
International energy indicators, February - March 1982
[DE82-014879] N83-29824
A Workshop on Alternative Fusion Concepts and Their Utilization Projections
[PB83-157966] N83-30263

ENERGY CONVERSION
Hydrodynamic/kinetic reactions in liquid-dominated geothermal systems
[DE82-017287] N83-29814
Magma source location survey
[DE82-019816] N83-29908
An inductive-store, pulsed power source
[DE82-015443] N83-30216
Inertial fusion: An energy-production option for the future
[DE82-019245] N83-30250

ENERGY DISSIPATION
Effects of variation in load history on cyclic response of concrete flexural members
[PB83-153403] N83-29741

ENERGY LEVELS
A system for measuring energy and peak power of low-level 1.064 micrometer laser pulses
[PB83-165027] N83-29703
Genetic danger of non-thermal intensity microradio waves and its hygienic aspects N83-29987
The application of Monte Carlo codes to neutron dosimetry
[DE82-017635] N83-30154
Molecular beam studies of low energy reactions
[AD-A126091] N83-30177
Neutrino oscillations: Present and future experiments
[DE82-903207] N83-30186
Polarized E + - polarized p colliding beams: Physics issues
[DE83-006645] N83-30295

ENERGY POLICY
Methanol as an alternate transportation fuel
[GPO-12-626] N83-29412
Proceedings of a National Seminar on Energy Challenge of the Eighties
[PB83-164764] N83-29442
Fusion Energy Workshop
[PUBL-97-128] N83-30236

ENERGY REQUIREMENTS
Proceedings of a National Seminar on Energy Challenge of the Eighties
[PB83-164764] N83-29442
Residential demand for energy. Volume 1: Residential energy demand in the US
[DE82-903277] N83-29818
Evaluation of the ORNL residential energy-use model
[DE82-905768] N83-29820
SERI Biomass Program
[DE83-009763] N83-29845

ENERGY SOURCES
Oil from plants
[DE83-009141] N83-29846

ENERGY SPECTRA
Selection of repetition frequencies for laser rangefinders
[AD-A126188] N83-29695
Application of adjusted data in calculating fission-product decay energies and spectra
[DE82-019182] N83-30193
Studying electron distributions using the time-resolved free-bound spectra from coronal plasmas
[DE83-006569] N83-30241

ENERGY STORAGE
Basic studies of gases for fast switches
[AD-A126343] N83-29618
FSA field test report, 1980 - 1982
[NASA-CR-172863] N83-29808
Fixed-base flywheel storage systems for electric-utility applications: An assessment of economic viability and R and D priorities
[DE83-007171] N83-29827
Present development status of Exxon's zinc-bromine battery for bulk energy storage
[DE82-013642] N83-29862
A composite-flywheel burst-containment study
[DE82-014138] N83-29865
An inductive-store, pulsed power source
[DE82-015443] N83-30216

ENERGY TECHNOLOGY
Assessment of residential passive solar/gas-fired energy systems
[PB83-167239] N83-29479
Oversight of Department of Energy research and development facilities
[GPO-99-908] N83-29807
OTEC plants for todays island market
[DE83-008670] N83-29847
Measures of value in a linear-programming model of the US energy system
[DE83-006685] N83-30087
EIA Data Index: An abstract journal. Third supplement, Jul.-Dec. 1981
[DE83-006533] N83-30311

ENERGY TRANSFER
Actionometry in monochromatic flash photolysis: The extinction coefficient of triplet benzophenone and quantum yield of triplet zinc tetraphenyl porphyrin
[DE83-006819] N83-29345
Studying electron distributions using the time-resolved free-bound spectra from coronal plasmas
[DE83-006569] N83-30241
Neutral beam heating in stellarators: A numerical approach
[DE83-010458] N83-30242

ENGINE CONTROL
Handling combat engines: The pilots viewpoint --- Mirage 2000 aircraft N83-29247
Flight test experience on military aircraft engine handling N83-29248
Throttle handling related to J85 engine performance and durability: Canadian forces experience N83-29249
Operational and maintenance aspects of the introduction of an advanced fighter type N83-29250
Experience with the KHD APU T312 for a modern fighter type N83-29251
Deterioration in service of engine transient behaviour N83-29256
The modern concept of acceleration control: Introduction to optimal command in a handling by objective structure N83-29267

ENGINE DESIGN
Multi-fuel rotary engine for general aviation aircraft
[NASA-TM-83429] N83-29235
The matrix of axial and radial plays: The present situation and perspectives --- turbojet engines N83-29253
Turbine tip clearance control in gas turbine engines N83-29254
Stirling engine design manual, 2nd edition
[NASA-CR-158088] N83-30328

ENGINE FAILURE
A theory of rotating stall of multistage axial compressors
[NASA-CR-3685] N83-29175
Throttle handling related to J85 engine performance and durability: Canadian forces experience N83-29249
Deterioration in service of engine transient behaviour N83-29256
Techniques for determining engine stall recovery characteristics N83-29265
Designing for stability in advanced turbine engines N83-29266

ENGINE INLETS
Effects of intake flow distortion on engine stability N83-29257

ENGINEERING MANAGEMENT
Engineering and Science Manpower Act of 1982
[GPO-96-196] N83-30323

ENTRAINMENT
V/STOL fountain force coefficient
[AD-A126261] N83-29200

ENTROPY (STATISTICS)
Entropy and information in the design and analysis of imaging systems N83-30221

ENVIRONMENT EFFECTS
US Synthetic Fuels Corporation and National Synfuels Policy
[GPO-96-481] N83-29413
Increased automobile fuel efficiency and synthetic fuels. Alternatives for reducing oil imports. Background paper number 3: Environmental issues of synthetic transportation fuels from coal
[PB83-161851] N83-29439
Reference marker: Photopoint resources management system
[PB83-163345] N83-29467
Summary and results of the comprehensive environmental monitoring program at the INEL's Raft River geothermal site
[DE83-005583] N83-29879
Plant growth in controlled environments in response to characteristics of nutrient solutions N83-30026
Environmental assessment data base for petroleum refining wastewaters and residuals
[PB83-164749] N83-30316

ENVIRONMENT POLLUTION
Design and development of a disc-windmill atomizer for aerial applications
[AE-8223] N83-29449

ENVIRONMENT PROTECTION
Reduced-pollution corrosion-protection systems
[PB83-153056] N83-29378
Field environmental evaluation plan for sulfur use in pavements
[PB83-156687] N83-29461
Arctic terrestrial environmental research programs of the Office of Energy Research, Department of Energy: Evaluation and recommendations
[DE82-018600] N83-29871
Finalization of reports entitled Updated Acid Rain Information Book and Simplification Approaches to Protecting PSD Class I Areas
[DE83-008771] N83-29877

ENVIRONMENT SIMULATION
Preliminary investigation of the characteristics of an oscillating windpowered generator --- atmospheric turbulence simulation
[TNO-82-0344] N83-29803
Image processing and digitization facility
[AD-A126307] N83-30074

ENVIRONMENTAL CHEMISTRY
Toxicology Information Response Center: A ten-year perspective
[DE82-017430] N83-30005

ENVIRONMENTAL MONITORING
Remote sensing program
[E83-10304] N83-29745
Monitoring biotransformation and biodegradation of xenobiotics in simulated aquatic microenvironmental systems
[PB83-153718] N83-29883

ENVIRONMENTAL SURVEYS
Effects of uranium oxides on some of the algae native to Eglin Air Force Base, Florida
[AD-A125478] N83-29970

ENVIRONMENTS
Autoallergic effects of microwave electromagnetic energy and their influence on the fetus and offspring N83-29971
Problems of studying the biological effect of electromagnetic fields discussed N83-29976

ENZYMES
USSR report: Life sciences. Effects of nonionizing electromagnetic radiation, no. 10
[JPRS-83745] N83-29973
Effect of low-intensity superhigh-frequency energy on respiration and oxidative phosphorylation of organ mitochondria and activity of some blood enzymes N83-29975
Effect of industrial frequency electric field (50 Hz) on metabolism of copper, iron and metalloenzymes bound to them (experimental research) N83-29985

EPHEMERIDES
Catalogue of 20457 star positions obtained by photography in the declination zone -48 deg to -54 deg (1950)
[AD-A126161] N83-30330

EPOXY COMPOUNDS
Epoxy thermoplastic pavement marking material: Summary of research results and revised specifications
[PB83-164848] N83-29475
Development of low-cost integrated zeolite collector, supplement
[DE83-006484] N83-29840
EPOXY MATRIX COMPOSITES
Laminate analyses, micromechanical creep response, and fatigue behavior of polymer matrix composite materials
[AD-A125784] N83-29316
Use of composites in aero-engines
[PNR-90149] N83-29322
EPOXY RESINS
Laminate analyses, micromechanical creep response, and fatigue behavior of polymer matrix composite materials
[AD-A125784] N83-29316
SEM/TEM fractography of composite materials
[AD-A125832] N83-29317
EQUATIONS OF MOTION
Confinement and heating of high-beta plasmas with emphasis on compact toroids. Task 2: High-beta Q-machine experiment
[DE82-020341] N83-30239
EQUATIONS OF STATE
Liquid-vapor equilibria for ternary natural gas systems
[PB83-173419] N83-29350
Thermodynamic consistency test procedure using orthogonal collocation and the Peng-Robinson equation of state
[DE83-007168] N83-30293
EQUATORIAL REGIONS
Measurements of radio refractive index profiles in tropical and equatorial regions and their influence on line of sight microwave links N83-29503
EQUILIBRIUM EQUATIONS
A saddle value characterization of Fan's equilibrium points
[AD-A126237] N83-30120
EQUIPMENT
Development of a solar-desiccant dehumidifier, phase 2
[DE83-005407] N83-29829
EQUIPMENT SPECIFICATIONS
Minimum operational performance standards for emergency locator transmitters. Automatic fixed, ELT (AF); automatic portable, ELT (AP); automatic deployable, ELT (AD); survival, ELT (S) operating on 121.5 and 243.0 megahertz
[RTCA/DO-183] N83-29488
EROSION
Czechoslovak Journal of Physics (selected articles)
[AD-A126183] N83-30162
ERROR ANALYSIS
Toward a metrology for precision-machine-tool control systems
[DE82-018077] N83-29458
Compiler features: A survey
[PB83-164418] N83-30046
ERROR CORRECTING CODES
Coding for frequency-hopped spread-spectrum channels with partial-band interference
[AD-A125872] N83-29582
ERROR DETECTION CODES
Real-time quality control of SAOs
[PB83-166082] N83-29944
ERROR FUNCTIONS
Numerical simulation of vortex breakdown by the vortex-filament method
[NASA-TM-84334] N83-29636
ERRORS
Global-error estimation for stiff ODEs
[DE83-006846] N83-30136
ESTIMATES
Mean monthly, seasonal and annual pan evaporation for the United States
[PB83-161729] N83-29942
ESTIMATING
Global-error estimation for stiff ODEs
[DE83-006846] N83-30136
Comparison of linear and nonlinear random field estimators
[PB83-169755] N83-30145
On the variance of probability estimates with correlated data
[AD-A126336] N83-30153
ESTUARIES
Literature review of organic matter transport from marshes
[E83-10352] N83-29750
ETCHING
MOS-transistors for power applications
[BMFT-FB-T-83-059] N83-29623
ETHYL ALCOHOL
Countercurrent reverse osmosis for ethanol-water separation
[DE83-009725] N83-29333
Low-energy process to extract anhydrous ethanol from fermentation beers
[DE83-005012] N83-29419
Continuous production of ethanol and chemical byproducts
[DE83-009667] N83-29421
Development of a process to produce alcohol at paper mills
[DE83-009668] N83-29422
Alcohol-Fuels Grant Program. Low-energy route for alcohol/gasohol recovery from fermentor beer
[DE83-009665] N83-29423
ETHYLENE
Studies on production results in the reaction of oxygen atoms with ethylene
[MPIS-18/1982] N83-30206
ETHYLENE COMPOUNDS
Applications of ethylene vinyl acetate as an encapsulation material for terrestrial photovoltaic modules
[NASA-CR-172862] N83-29809
EULER EQUATIONS OF MOTION
Flux-based acceleration of the Euler equations
[NASA-TM-83453] N83-30113
EUTECTIC COMPOSITES
Microstructure and fatigue behavior of 3 nickel base eutectic composites
[AD-A125571] N83-29369
EVALUATION
Evaluation of high performance aircrew helmets and oxygen masks
[AD-A126036] N83-30038
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172901] N83-30057
Development and qualification of computer-aided assessment (CAS)
[AD-A125477] N83-30078
EVAPORATION
Spontaneous ignition characteristics of hydrocarbon fuel-air mixtures N83-29231
MORECS (Metrological Office Rainfall and Evaporation Calculation Scheme) discussion meeting, April 1981
[PB83-163212] N83-29798
Mean monthly, seasonal and annual pan evaporation for the United States
[PB83-161729] N83-29942
EXCITATION
Seismic energy absorption in simple structures
[PB83-143917] N83-29464
Microwave conditioned dc discharges for excitation of rare-gas-halide lasers
[AD-A126222] N83-29694
Quantum dynamical model for laser excitation of a two-level adatom: Surface-dressed Bloch equations
[AD-A126201] N83-29696
Spectroscopic properties of metal monoxides and hydroxides important in the ionosphere
[AD-A126332] N83-29905
EXERCISE PHYSIOLOGY
CO2 retention and ECG changes in exercise during prolonged hyperbaric N2-O2 breathing
[AD-A125403] N83-30002
EXHAUST EMISSION
Pollutant formation in monodisperse fuel spray combustion N83-29213
Computations of emissions using a 3-D combustor program N83-29226
Multi-fuel rotary engine for general aviation aircraft
[NASA-TM-83429] N83-29235
Diesel exhaust-gas purification system
[DE82-019808] N83-29719
Emission characterization of a spark-ignited, heavy-duty, direct-injected methanol engine
[PB83-156372] N83-29722
Emissions and fuel economy of the Kat's engine block heater device
[PB83-165548] N83-29724
Gaseous continuous emission monitoring systems. Performance specification guidelines for SO2, NOx, CO2, O2 and TRS
[PB83-161646] N83-29886
User's instructions for the SHORTZ and LONGZ computer programs, volume 1
[PB83-146100] N83-30093
EXOBIOLOGY
Use of magnets in medical treatment N83-29986
Aerospace medicine and biology: A continuing bibliography with indexes (supplement 247)
[NASA-SP-7011(247)] N83-29989
Research opportunities in space motion sickness, phase 2
[NASA-CR-3708] N83-29993
Publications of the exobiology program for 1982. A special bibliography
[NASA-TM-85837] N83-30041
EXOTHERMIC REACTIONS
Studies on production results in the reaction of oxygen atoms with ethylene
[MPIS-18/1982] N83-30206
EXPLORATION
Response of a layer to sinusoidal or impulsive electromagnetic excitation: Approximation of the thin plate — Earth resource exploration N83-29548
EXPLOSIVES
Three dimensional modeling of shock initiation of heterogeneous explosives
[DE82-006145] N83-29426
PRESS: A computer program for evaluating explosive-material loading processes
[DE82-015256] N83-29427
EXPOSURE
Action of industrial frequency electric field on indicators of natural immunity N83-29984
EXTENSIONS
A finite flag-transitive geometry of extended G2-type
[MC-ZW-176/82] N83-30141
EXTINCTION
Lean limit phenomena N83-29229
EXTINGUISHING
Studies of dry-powder extinguishment of diffusion flames for condensed fuels
[PB83-150656] N83-29348
EXTRACTION
Recovery of tungsten from a hydrothermally altered deposit. Report of investigations, 1982
[PB83-157719] N83-29381
Low-energy process to extract anhydrous ethanol from fermentation beers
[DE83-005012] N83-29419
Direct enzymatic extraction of starch from corn as an energy-saving alternative to production of high-fructose syrup
[DE82-008314] N83-29822
Magma source location survey
[DE82-019816] N83-29908
EXTRAPOLATION
Subsonic panel method for designing wing surfaces from pressure distribution
[NASA-CR-3713] N83-29198
Multidimensional signal restoration and band-limited extrapolation, 2
[AD-A125877] N83-29583
Mean monthly, seasonal and annual pan evaporation for the United States
[PB83-161729] N83-29942
EXTRAVEHICULAR ACTIVITY
Shuttle EVA description and design criteria
[NASA-TM-85355] N83-29297
EXTREMELY HIGH FREQUENCIES
Amplitude scintillation in propagation paths above 10 GHz N83-29508
Correlation between various radioelectrical data at 11.4, 11.6, and 35 GHz — OTS and radiometer data N83-29513
One-hundred GHz open-resonator measurements of artificial precipitation and fog propagation parameters N83-29522
Influence of surface type on the brightness temperature of snow-covered terrain — satellite observation N83-29532
Radiative transfer in size-limited bodies — rain attenuation N83-29544
Propagation characteristics at 35 and 78 GHz for spaceborne altimeters N83-29546
Experimental and analytical aspects of atmospheric EHF refractivity N83-29556
Definition of standards and methods of calibrating for Imaging Microwave Radiometers (IMR)
[ESA-CR(P)-1724] N83-29671
EXTREMELY LOW FREQUENCIES
ELF (Extremely Low Frequency) PVS (Propagation Validation System) field strength measurements, January and February, 1978
[AD-A126208] N83-29577
EYE (ANATOMY)
Influence of prolonged illumination of the rabbit retina by monochromatic light on its functional state N83-29979

F

F-16 AIRCRAFT
Operational and maintenance aspects of the introduction of an advanced fighter type N83-29250

FABRICATION
Applications of composite gas-turbine components, phase 1
[DE83-006574] N83-29718
Present development status of Exxon's zinc-bromine battery for bulk energy storage
[DE82-013642] N83-29862
X-ray imaging mirror system and method of producing the same
[NASA-CASE-NPO-15828-1] N83-30222
GaAs Schottky barrier photo-responsive device and method of fabrication — photovoltaic cells
[NASA-CASE-GSC-12816-1] N83-30268
FACTOR ANALYSIS
Procedures for the measurement of acute mountain sickness
[AD-A126280] N83-29995
FAILURE
Specifying reliability as a software attribute
[AD-A125934] N83-30075
FAILURE ANALYSIS
Rotor fragment protection program: Statistics on aircraft gas turbine engine rotor failures that occurred in US commercial aviation during 1979
[NASA-CR-168163] N83-29234
Study of an automatic trajectory following control system
[NASA-CR-166121] N83-29271
SEM/TEM fractography of composite materials
[AD-A125832] N83-29317
A solvent resistant, thermoplastic aromatic poly(imidesulfone) and process for preparing same
[NASA-CASE-LAR-12858-2] N83-29391
The duration period of propellants for classical and rocket armament
[AD-A126219] N83-29417
Latex improvement of recycled asphalt pavement
[PB83-152694] N83-29460
Transducer reliability in engineering research and development — jet engine tests
[PNR-90147] N83-29669
Innovation for maintenance technology improvements
[PB83-149450] N83-29728
Application of advanced reliability methods to local strain fatigue analysis
[NASA-CR-168198] N83-29734
Effects of variation in load history on cyclic response of concrete flexural members
[PB83-153403] N83-29741
Material problems in lithium, ambient-temperature, primary batteries
[DE82-010083] N83-29860
Development and qualification of computer-aided assessment (CAS)
[AD-A125477] N83-30078
Czechoslovak Journal of Physics (selected articles)
[AD-A126183] N83-30162
FAILURE MODES
Behavior and design of reinforced concrete column-type lapped splices subjected to high-intensity cyclic loading
[PB83-165134] N83-29474
Mechanical behavior of shear wall vertical boundary members: An experimental investigation
[PB83-159764] N83-29742
Compatability and accelerated aging study for Li(Si)FeS2 thermally activated batteries
[DE82-009026] N83-29817
An O(/E/) time algorithm for computing the reliability of a class of directed networks
[PB83-167197] N83-30159
FAR INFRARED RADIATION
New pulsed far infrared laser lines in D2O
[IPF-82-13] N83-29701
FAR ULTRAVIOLET RADIATION
Resonantly enhanced vacuum-ultraviolet generation and multiphoton ionization in carbon monoxide gas
[DE82-012147] N83-30183
FARMLANDS
Use of remote sensing for land use policy formulation
[E83-10326] N83-29747
Agricultural land cover mapping in the context of a geographically referenced digital information system — Carroll, Macon, and Gentry Counties, Missouri
[E83-10357] N83-29768
FAST NEUTRONS
Rapid annealing in advanced bipolar microcircuits
[DE82-018772] N83-29616
FASTENERS
Daze fasteners
[NASA-CASE-LAR-13009-1] N83-29706
FATIGUE (MATERIALS)
Performance of a quantitative study of instability-related delamination growth
[NASA-CR-166046] N83-29314
Laminate analyses, micromechanical creep response, and fatigue behavior of polymer matrix composite materials
[AD-A125784] N83-29316
Effect of microstructure and internal hydrogen on fatigue crack propagation of ultrahigh strength steels
N83-29357
Microstructure and fatigue behavior of 3 nickel base eutectic composites
[AD-A125571] N83-29369
Wear particle atlas, revised
[AD-A125512] N83-29402
Vibration in planetary gear systems with unequal planet stiffnesses
[NASA-TM-83428] N83-29709
FATIGUE LIFE
Throttle handling related to J85 engine performance and durability: Canadian forces experience N83-29249
FATIGUE TESTS
Statistical summaries of fatigue data for design purposes
[NASA-CR-3697] N83-29731
FAULT TOLERANCE
Development of software fault-tolerance techniques
[NASA-CR-172122] N83-30052
FEASIBILITY
Low-energy process to extract anhydrous ethanol from fermentation beers
[DE83-005012] N83-29419
FEASIBILITY ANALYSIS
Progress in studies on catalyzed gasification of wood
[DE83-009124] N83-29332
Transco medium-Btu coal gasification project. Executive summary
[DE82-009598] N83-29418
Commercial scale coal test. Volume 4: Coal fines utilization in furnace boilers
[DE83-007450] N83-29433
Methanol from landfill gas: Technology and economics
[PB83-169144] N83-29443
Feasibility of night-sky radiation with heat pumps
[DE83-006812] N83-29850
Mechanical, thermal, and fluid transport properties of rock at depth
[DE82-016008] N83-29912
Feasibility study of mitigating tsunami hazards in the Pacific
[PB83-156885] N83-29966
FECES
To produce nutrients for plant growth N83-30027
FEDERAL BUDGETS
Department of the Air Force supporting data for fiscal year 1984 budget estimates submitted to Congress, January 31, 1983. Descriptive summaries, research, development, test and evaluation
[AD-A125932] N83-30301
National Aeronautics and Space Administration Authorization Act, 1983 N83-30324
FEED SYSTEMS
Line-sinter processing of anorthosite for the recovery of alumina
[PB83-148435] N83-29379
FEEDBACK CONTROL
Antenna digital control for the Directed Mirror Antenna Radar (DMAR)
[AD-A125812] N83-29585
Three phase power factor controller
[NASA-CASE-MFS-25535-2] N83-29593
Chained aggregation and control system design: A geometric approach
[AD-A125853] N83-30098
Case-studies in direct digital control of stochastic systems
[OUEL-1430/82] N83-30102
FERMENTATION
Low-energy process to extract anhydrous ethanol from fermentation beers
[DE83-005012] N83-29419
Continuous production of ethanol and chemical byproducts
[DE83-009667] N83-29421
Alcohol-Fuels Grant Program. Low-energy route for alcohol/gasohol recovery from fermentor beer
[DE83-009665] N83-29423
Production of butanol by fermentation in the presence of co-culture of clostridium
[NASA-CASE-NPO-16203-1] N83-29806
FERMIONS
Higgs mass scales and matter-anti-matter oscillations in grand unified theories
[DE82-017638] N83-30294
FERRIMAGNETS
Process for producing oxygen
[DE83-006648] N83-29344
FERRITIC STAINLESS STEELS
Protecting against failure by brittle fracture in ferritic-steel shipping containers greater than 4 inches thick
[DE83-007462] N83-29372
FERROELECTRICITY
Ferroelectric thin films for imaging and signaling techniques
[BMFT-FB-T-83-015] N83-30287
FERROMAGNETIC RESONANCE
Research to develop and evaluate advanced eddy current sensors for detecting small flaws in metallic aerospace components
[AD-A125873] N83-29726
FERROUS METALS
Recycling municipal ferrous scrap
[PB83-156968] N83-29384
Ferrous metal fires
[PB82-263161] N83-29387
FERTILIZERS
Selection of crop varieties for efficient production using urea, ammonia, nitrite, and nitrate in cells N83-30025
FETUSES
USSR report: Life sciences. Effects of nonionizing electromagnetic radiation, no. 10
[JPRS-83745] N83-29973
Autoallergic effects of microwave electromagnetic energy and their influence on the fetus and offspring
N83-29974
FIBER OPTICS
A distributed network supporting ocean surveillance
[AD-A125559] N83-29954
Voice control of an unmanned submersible
[AD-A125523] N83-30039
Metal coated optical fibers for sensors
[AD-A126068] N83-30224
Field expedient repair of fiber optic cables
[AD-A126075] N83-30225
Fiber optic magnetic sensor research
[AD-A126325] N83-30228
Fiber optics in aircraft applications
[AD-A126165] N83-30230
Propagation properties of surface-wave modes in a quasi-multimode, uniaxially anisotropic, graded-index optical waveguide with circularly cylindrical symmetry
[PB83-165167] N83-30235
FIBER REINFORCED COMPOSITES
Low temperature cross linking polyimides
[NASA-CASE-LEW-12876-2] N83-29392
Cross-linking reactions of thermally stable high performance polymers
[AD-A125967] N83-29397
Curved cap corrugated sheet
[NASA-CASE-LAR-12884-1] N83-29446
FICKS EQUATION
Oxygen diffusion of anodic surface oxide film on titanium studied by Auger electron spectroscopy
[DE82-013653] N83-29340
FIELD EFFECT TRANSISTORS
Camel gate field effect transistors
[AD-A125942] N83-29608
Planar optical sources and detectors for monolithic integration with GaAs MESFET electronics
[DE82-010896] N83-29615
FIELD STRENGTH
ELF PVS field strength measurements, April 1977
[AD-A126212] N83-29574
ELF (Extremely Low Frequency) PVS (Propagation Validation System) field strength measurements, January and February, 1978
[AD-A126208] N83-29577
FIGHTER AIRCRAFT
Engine Handling
[AGARD-CP-324] N83-29241
Handling combat engines: The pilots viewpoint — Mirage 2000 aircraft N83-29247
Experience with the KHD APU T312 for a modern fighter type N83-29251
FILLERS
Polyvinyl alcohol battery separator containing inert filler
[NASA-CASE-LEW-13556-2] N83-29805
FILM THICKNESS
Degassifying and mixing apparatus for liquids — potable water for spacecraft
[NASA-CASE-MSC-18936-1] N83-29652
Theoretical results for starved elliptical contacts
[NASA-TM-81697] N83-29710
Applications of film thickness equations
[NASA-TM-81701] N83-29713
FILTRATION
Preconcentration methods for trace element determination
[PB83-172536] N83-29351
A solvent resistant, thermoplastic aromatic poly(imidesulfone) and process for preparing same
[NASA-CASE-LAR-12858-2] N83-29391

FINANCIAL MANAGEMENT
Research in space commercialization, technology transfer and communications
[NASA-CR-172887] N83-30327
FINE STRUCTURE
Statistics on the fine scale structure of rain in Stockholm, 1977-1979 N83-29521
FINES
Tri-State Synfuels project commercial scale coal test. Volume 2A: Collection and shipment mine, barge, ship and train programs
[DE83-007443] N83-29431
Commercial scale coal test. Volume 4: Coal fines utilization in furnace boilers
[DE83-007450] N83-29433
Thermal behavior of fine-grained soils. Building science series
[PB83-164400] N83-29472
FINITE DIFFERENCE THEORY
Numerical solution of a coupled pair of elliptic equations from solid state electronics
[NASA-CR-172128] N83-30109
Finite-difference, spectral and Galerkin methods for time-dependent problems
[NASA-CR-172149] N83-30110
A compact finite difference scheme for div(Rho grad u) - q2u = 0
[NASA-CR-172165] N83-30112
Multi-gold algorithms with applications to elliptic boundary-value problems
[AD-A125769] N83-30114
Stability analysis of finite difference schemes for the advection-diffusion equation
[NASA-CR-172823] N83-30123
A finite difference solution for the propagation of sound in near sonic flows
[NASA-TM-84663] N83-30167
FINITE ELEMENT METHOD
Applications of energy-release-rate techniques to part-through cracks in plates and cylinders, volume 2. ORVIRT: A finite element program for energy release rate calculations for 2-dimensional and 3-dimensional crack models
[DE83-007081] N83-29739
Geophysical plasmas and atmospheric modeling
[AD-A126341] N83-29904
An introduction to the FEARS (Finite Element Adaptive Research Solver) program
[AD-A127737] N83-30081
N-person differential games. Part 2: The penalty method
[NASA-CR-166111] N83-30106
Multi-gold algorithms with applications to elliptic boundary-value problems
[AD-A125769] N83-30114
High-performance banded and profile equation solvers for the CRAY-1. Part 1: The unsymmetric case
[AD-A125561] N83-30115
Finite-element approach to analyzing coupled thermal-hydraulic problems
[DE83-007565] N83-30139
Recently developed methods in neutral-particle transport calculations: Overview
[DE82-014043] N83-30197
FINS
The evaluation of the rolling moments induced by wraparound fins
[NASA-TM-84381] N83-29180
FIRE CONTROL
Selection of repetition frequencies for laser rangefinders
[AD-A126188] N83-29695
FIRE FIGHTING
Measurements of airtanker drop conditions during firefighting operations
[PB83-157883] N83-29203
FIRE PREVENTION
Proceedings of the 6th Annual Conference on Fire Research
[PB83-155887] N83-29463
FIREPROOFING
Fuel fire tests of selected assemblies
[AD-A125820] N83-29450
FIRES
Ferrous metal fires
[PB82-263161] N83-29387
Proceedings of the 6th Annual Conference on Fire Research
[PB83-155887] N83-29463
FIRING (IGNITING)
The criteria used for assessing acceptable engine handling on UK military aircraft N83-29244
FISCHER-TROPSCH PROCESS
CO + H sub 2 reactions over nitrogen-modified iron catalysts
[DE83-006579] N83-29335
FISSION
Microfissuring of Inconel 718
[NASA-TM-82531] N83-29356
Nuclear-spectroscopy problems studied with neutrons
[DE82-017303] N83-30192
FIXED WINGS
A survey of serious aircraft accidents involving fatigue fracture. Volume 1: Fixed-wing aircraft
[NAE-AN-7] N83-29187
FLAME HOLDERS
Fuel vaporization effects N83-29214
FLAME PROPAGATION
Flame radiation measurements N83-29228
FLAME RETARDANTS
Fuel fire tests of selected assemblies
[AD-A125820] N83-29450
FLAME STABILITY
Lean limit phenomena N83-29229
FLAMES
Unsteady flow effects in combustor systems N83-29232
Numerical modeling of turbulent combustion N83-29233
FLASH LAMPS
An investigation of the basic characteristics of the radiation of straight xenon flash tubes
[DE82-016680] N83-29614
FLAT PLATES
Infrared detection of microwave induced surface currents on flat plates
[AD-A126207] N83-30227
FLEXIBLE SPACECRAFT
Attitude dynamics and stability of large flexible structures in orbit N83-29729
FLEXING
SEASAT observations of lithospheric flexure seaward of trenches
[E83-10353] N83-29751
FLIGHT CONDITIONS
Flight test experience on military aircraft engine handling N83-29248
Real-time quality control of SAOs
[PB83-166082] N83-29944
FLIGHT CREWS
Investigation of crew restraint system biomechanics
[AD-A126199] N83-29190
Evaluation of high performance aircrew helmets and oxygen masks
[AD-A126036] N83-30038
FLIGHT PATHS
Minimum noise impact aircraft trajectories N83-29191
Measurements of airtanker drop conditions during firefighting operations
[PB83-157883] N83-29203
OPTIM: Computer program to generate a vertical profile which minimizes aircraft fuel burn or direct operating cost. User's guide
[NASA-CR-166061] N83-30061
FLIGHT RECORDERS
Operational engine usage N83-29246
FLIGHT SIMULATION
Variable acuity remote viewing system flight demonstration
[NASA-CR-170404] N83-29204
Experimental aerodynamic facilities of the Aerodynamics Research and Concepts Assistance Section
[AD-A126272] N83-29274
FLIGHT TESTS
Design, construction and test of an experimental propeller in the power range 750 HP
[BMFT-FB-W-83-004] N83-29184
Modeling of the Mode S tracking system in support of aircraft safety research
[NASA-CR-166486] N83-29186
Validation flight test of UH-60A for Rotorcraft Systems Integration Simulator (RSIS)
[AD-A125428] N83-29201
Engine Handling
[AGARD-CP-324] N83-29241
A look at engine handling aspects from aircraft flight test experience; with an outlook for future requirements N83-29245
Throttle handling related to J85 engine performance and durability: Canadian forces experience N83-29249
Proving the Space Transportation System: The orbital flight test program
[NASA-FACTS-137-83] N83-29298
Evaluation of high performance aircrew helmets and oxygen masks
[AD-A126036] N83-30038
FLOCCULATING
Compact flocculation system with sludge and separators and thickeners at the Langenau Waterworks. Development and construction of a high-capacity flocculation system
[BMFT-FB-T-83-037] N83-29459
FLOODS
Derivation of catchment average unit hydrograph
[PB83-164574] N83-29797
FLORIDA
Satellite freeze forecast system: Executive summary
[E83-10368] N83-29778
Acidity, nutrients and minerals in atmospheric precipitation over Florida: Deposition patterns, mechanisms and ecological effects
[PB83-165837] N83-29888
Cavity detection and delineation research. Part 4: Microgravimetric survey: Manatee Springs Site, Florida
[AD-A125900] N83-29906
Cape Canaveral, Florida range reference atmosphere 0-70 km altitude
[NASA-TM-85253] N83-29935
FLOW CHARACTERISTICS
Prediction of flow depth and sediment discharge in open channels
[PB83-165696] N83-29468
Flow in a partially filled rotating cylinder N83-29626
Large-scale separation and wake closure/reattachment. The cascade problem
[UTRC83-13] N83-29629
FLOW CHARTS
Hanford solid-waste handling facility strategy
[DE82-017163] N83-30215
FLOW DISTORTION
Influence of a large free stream disturbance level on dynamics of a jet in a cross flow N83-29217
Modelling compression component stability characteristics: Effects of inlet distortion and fan bypass duct disturbances N83-29261
FLOW DISTRIBUTION
Axial compressor middle stage secondary flow study
[NASA-CR-3701] N83-29174
A theory of rotating stall of multistage axial compressors
[NASA-CR-3685] N83-29175
Turbulent combustor flowfield investigation N83-29220
Small gas turbine combustor primary zone study N83-29221
Velocity visualization in gaseous flows N83-29223
Unsteady flow effects in combustor systems N83-29232
Numerical modeling of turbulent combustion N83-29233
Test facility for basic research on distortion N83-29258
Non-steady gas dynamic effects in the induction domain behind a strong shock wave
[CA-8229] N83-29633
Numerical simulation of vortex breakdown by the vortex-filament method
[NASA-TM-84334] N83-29636
FLOW GEOMETRY
Monte Carlo modeling in elliptic flows N83-29225
FLOW RESISTANCE
Flow resistivity instrument
[NASA-CASE-LAR-13053-1] N83-29783
FLOW VELOCITY
Theoretical investigations of particle behavior in the high velocity domain --- test particles in high velocity flow
[IFD-2/82] N83-29183
Numerical simulation for droplet combustion using Lagrangian hydrodynamics N83-29210
Venturi design for metering solids flow in gas-solids suspensions
[DE83-004314] N83-29660
Preliminary investigation of the characteristics of an oscillating windpowered generator --- atmospheric turbulence simulation
[TNO-82-0344] N83-29803
FLOW VISUALIZATION
Velocity visualization in gaseous flows N83-29223
FLOWMETERS
Venturi design for metering solids flow in gas-solids suspensions
[DE83-004314] N83-29660
FLUID DYNAMICS
Structure of evaporating and combusting sprays: Measurements and predictions N83-29211
Non-steady gas dynamic effects in the induction domain behind a strong shock wave
[CA-8229] N83-29633
Fluid dynamic experiment in a surface tension tank: Phase 1/Phase 2A
[BMFT-FB-W-83-002] N83-29649
Degassifying and mixing apparatus for liquids --- potable water for spacecraft
[NASA-CASE-MSC-18936-1] N83-29652
Self-consistent electron transport in collisional plasmas
[DE82-014083] N83-30244

Major disruptions, inverse cascades and the Strauss equations
[DE82-017188] N83-30252

FLUID FILLED SHELLS
Flow in a partially filled rotating cylinder N83-29626

FLUID FILTERS
NBS portable ambient particulate sampler
[PB83-165019] N83-29679

FLUID FLOW
Flow in a partially filled rotating cylinder N83-29626
Dual laser optical system and method for studying fluid flow
[NASA-CASE-MFS-25315-1] N83-29680

FLUID MECHANICS
Fuel spray diagnostics N83-29212
Process parameter effects on arc physics and heat flow in GTAW
[DE82-017269] N83-29717

FLUORESCENCE
Kinetic studies of gas phase free radicals
[AD-A125516] N83-29688
Spectroscopic properties of metal monoxides and hydroxides important in the ionosphere
[AD-A126332] N83-29905

FLUTTER
Vibration and aeroelastic facility
[AD-A126317] N83-29275

FLUX DENSITY
Formation of quark-gluon plasma in nuclear collisions
[DE82-018521] N83-30184

FLY ASH
Commercial scale coal test. Volume 1: Selection of camp 1 coal
[DE83-007436] N83-29435

FLYWHEELS
Fixed-base flywheel storage systems for electric-utility applications: An assessment of economic viability and R and D priorities
[DE83-007171] N83-29827
A composite-flywheel burst-containment study
[DE82-014138] N83-29865

FOAMS
Experimental polyurethane foam roof systems, part 2
[AD-A126315] N83-29453

FOCUSING
Neutral beam heating in stellarators: A numerical approach
[DE83-010458] N83-30242
Focusing and imaging sharp line X-ray and gamma-ray sources using variable-metric diffraction crystals
[DE83-007769] N83-30285

FOG
One-hundred GHz open-resonator measurements of artificial precipitation and fog propagation parameters N83-29522

FOKKER-PLANCK EQUATION
Relativistic two-dimensional theory of RF current drive
[DE83-010250] N83-29613

FOOD INTAKE
Development of selection criteria and their application in evaluation of CELSS candidate species N83-30021

FOOD PROCESSING
Food systems for PCELSS N83-30028

FORESTS
Utilization of LANDSAT multispectral data in geobotanical investigations: The location of ironstone gravel in the Sam Houston National Forest
[E83-10361] N83-29772
Forestry information systems and terminology
[PB83-156158] N83-30315

FORMAT
Initial Graphics Exchange Specification (IGES), version 2.0
[PB83-137448] N83-30092

FORMATES
Structures and polarized electronic absorption spectra of dimolybdenum tetraformate crystals
[DE83-004863] N83-30281

FORTRAN
Compiler features: A survey
[PB83-164418] N83-30046
Programs for solving polynomial equations
[PB83-167171] N83-30089

FORWARD SCATTERING
Influence of raindrop oscillations on coherent forward scattering of microwaves in rain N83-29528

FOSSIL FUELS
US Synthetic Fuels Corporation and National Synfuels Policy
[GPO-96-481] N83-29413
Crosbyton Solar Power Project. Volume 8: Preliminary design of 55-MWe solar-fossil hybrid electric power plant at Crosbyton, Texas
[DE83-005285] N83-29832
Assessing very long-range impacts from a rapid climate change
[DE82-017229] N83-29937

FRACTIONATION
A spillage detector for liquid chromatography systems
[NASA-CASE-MSC-20206-1] N83-29325

FRACTURE MECHANICS
SEM/TEM fractography of composite materials
[AD-A125832] N83-29317
Elastomer toughened polyimide adhesives
[NASA-LAR-12775-2] N83-29390
Silicon carbide alloys
[AD-A125968] N83-29398
Innovation for maintenance technology improvements
[PB83-149450] N83-29728
Load ratio and environmental effects on fatigue crack growth rates for several ship steels
[AD-A126285] N83-29735
Propagation elastic-plastic fields: Asymptotic analysis of plane strain crack growth and restrictions on moving surfaces of strong discontinuity
[DE82-018820] N83-29737
Applications of energy-release-rate techniques to part-through cracks in plates and cylinders, volume 2. ORVIRT: A finite element program for energy release rate calculations for 2-dimensional and 3-dimensional crack models
[DE83-007081] N83-29739
Cross-borehole fracture mapping using electromagnetic geotomography
[DE82-012699] N83-29910
Step cracks: Theory, experiment, and field observation
[DE82-014558] N83-29911
Dispersion in fracture networks
[DE83-005584] N83-29913
Simple strength tests on and hydraulic fracturing of rock material
[PB83-165514] N83-29918

FRACTURE STRENGTH
The effect of extreme temperatures on the elastic properties and fracture behavior of graphite/polyimide composites
[NASA-CR-172143] N83-29315
Sensing systems for measuring mechanical properties in ground masses. Volume 3: Vane shear and cone piezometer
[PB83-155960] N83-29793

FRACTURES (MATERIALS)
Protecting against failure by brittle fracture in ferritic-steel shipping containers greater than 4 inches thick
[DE83-007462] N83-29372

FRACTURING
Simple strength tests on and hydraulic fracturing of rock material
[PB83-165514] N83-29918
Analysis of the internal point load test
[PB83-164566] N83-29919

FRAMES
States of the art and practice in the optimum seismic design and analytical response prediction of r/c frame-wall structures
[PB83-147736] N83-29465

FREE CONVECTION
Time-dependent convection --- in microgravity
[BMFT-FB-W-83-001] N83-29648

FREE ELECTRON LASERS
The free electron laser: A resource paper
[PB83-148931] N83-29704

FREE ELECTRONS
Start-up of a pulsed beam Free Electron Laser (FEL) oscillator
[AD-A126306] N83-29684

FREE ENERGY
Diagrams for the free energy and density weight factors of the Ising models
[AD-A126295] N83-30278

FREE FLOW
Influence of a large free stream disturbance level on dynamics of a jet in a cross flow N83-29217
Generalized view factor techniques for treating streaming and scattering in neutral-particle transport
[DE82-014046] N83-30196

FREE RADICALS
Kinetic studies of gas phase free radicals
[AD-A125516] N83-29688

FREEZE DRYING
To produce nutrients for plant growth N83-30027

FREEZING
Satellite freeze forecast system: Executive summary
[E83-10368] N83-29778

FREQUENCY MODULATION
Distortions in FM car radios caused by multipath reception and their reduction by means of antenna diversity N83-29502

FREQUENCY STANDARDS
Phase 2B prototype redesign, tactical rubidium frequency standard
[AD-A126320] N83-29658

FRICTION
Large airplane operations on contaminated runways
[PB83-917003] N83-29189
PRESS: A computer program for evaluating explosive-material loading processes
[DE82-015256] N83-29427
Frictional secondary circulation near an upwelled thermocline
[PB83-162024] N83-29965

FRICTION FACTOR
Synthesis of frictional requirements research
[PB83-156315] N83-29466

FUEL CELL POWER PLANTS
Task 4 completion report for 40 Kilowatt grid connected modification contract
[NASA-CR-167950] N83-30297

FUEL COMBUSTION
Numerical simulation for droplet combustion using Lagrangian hydrodynamics N83-29210
Structure of evaporating and combusting sprays: Measurements and predictions N83-29211
Fuel spray diagnostics N83-29212
Pollutant formation in monodisperse fuel spray combustion N83-29213
Fuel vaporization effects N83-29214
Coupling of transport and chemical processes in catalytic combustion N83-29230
The NASA broad-specification fuels combustion technology program: An assessment of phase 1 test results
[NASA-TM-83447] N83-29236
Analysis of refractory fiber insulations and hot face coatings exposed to coal-oil mixture combustion products
[DE82-018210] N83-29321
Commercial scale coal test. Volume 4: Coal fines utilization in furnace boilers
[DE83-007450] N83-29433

FUEL CONSUMPTION
Increased automobile fuel efficiency and synthetic fuels. Alternatives for reducing oil imports. Background paper number 3: Environmental issues of synthetic transportation fuels from coal
[PB83-161851] N83-29439
Summary of status of Environmental Protection Agency (EPA), Office of Mobile Sources Characterization Projects as of March, 1982
[PB83-163972] N83-29441
Analysis of in-use fuel economy data, stage 1
[PB83-144162] N83-29721
Emissions and fuel economy of the Kat's engine block heater device
[PB83-165548] N83-29724
OPTIM: Computer program to generate a vertical profile which minimizes aircraft fuel burn or direct operating cost. User's guide
[NASA-CR-166061] N83-30061

FUEL CONTROL
Potential benefits of a Full Authority Digital Electronic Control (FADEC) installed on a TF30 engine in an F14 flight test demonstrator aircraft N83-29269

FUEL FLOW
A new approach to reheat control N83-29268

FUEL INJECTION
Spontaneous ignition characteristics of hydrocarbon fuel-air mixtures N83-29231

FUEL OILS
Residential demand for energy. Volume 1: Residential energy demand in the US
[DE82-903277] N83-29818

FUEL PRODUCTION
Hydropyrolysis of biomass to produce liquid hydrocarbon fuels
[DE83-009985] N83-29420

FUEL SYSTEMS
The NASA broad-specification fuels combustion technology program: An assessment of phase 1 test results
[NASA-TM-83447] N83-29236

FUEL-AIR RATIO
Analytical modeling of operating characteristics of premixing-prevaporizing fuel-air mixing passages N83-29209
Fuel spray diagnostics N83-29212
Fuel vaporization effects N83-29214

FUELS
Marine Biomass Program: Kelp biomass program summary
[PB83-167247] N83-29438
Environmental fate of hydrazine fuels in aqueous and soil environments
[AD-A125813] N83-29870

Thermodynamic consistency test procedure using orthogonal collocation and the Peng-Robinson equation of state
[DE83-007168] N83-30293
FUNCTIONS (MATHEMATICS)
The structure of divide and conquer algorithms
[AD-A126086] N83-30124
FURNACES
In-plant recycling of stainless and other specialty steelmaking wastes. Report on investigations, 1982
[PB83-157701] N83-29382
Industrial burner and process efficiency program
[PB83-161059] N83-29482
FUSELAGES
Small transport aircraft technology propeller study
[NASA-CR-166045] N83-29178
FUSION REACTORS
Nuclear-spectroscopy problems studied with neutrons
[DE82-017303] N83-30192
Fusion Energy Workshop
[PUBL-97-128] N83-30236
Preliminary conceptual design study of a suppressed-fission Tokamak hybrid
[DE83-006428] N83-30255

G

GALACTIC NUCLEI
Phenomenological model of the nucleus of the galaxy
[PR-728] N83-30335
GALACTIC RADIATION
Detailed observations of NGC 4151 with IUE (International Ultraviolet Explorer). Paper 2: Variability of the continuum from 1978 February to 1980 May, including X-ray and optical observations
[PB83-164947] N83-30338
GALERKIN METHOD
Finite-difference, spectral and Galerkin methods for time-dependent problems
[NASA-CR-172149] N83-30110
GALLIUM ARSENIDES
Microelectronic position sensors
[BMFT-FB-T-83-034] N83-29375
Planar optical sources and detectors for monolithic integration with GaAs MESFET electronics
[DE82-010896] N83-29615
GaAs Schottky barrier photo-responsive device and method of fabrication --- photovoltaic cells
[NASA-CASE-GSC-12816-1] N83-30268
Experimental studies of lateral electron transport in gallium arsenide-aluminum gallium arsenide heterostructures
[AD-A125858] N83-30275
GAME THEORY
Linear programming and finite Markovian control problems
[MATH-CENTRE-TRACTS-148] N83-30050
N-person differential games. Part 2: The penalty method
[NASA-CR-166111] N83-30106
GAMMA RAY BURSTS
A study of the temporal and spectral characteristics of gamma ray bursts
[NASA-TM-85031] N83-30350
GAMMA RAY SPECTRA
Tests of a resonance detector spectrometer for electron-volt spectroscopy
[DE83-007611] N83-29666
GAMMA RAYS
Gamma decay of unbound states following neutron capture
[DE82-017305] N83-30191
Application of adjusted data in calculating fission-product decay energies and spectra
[DE82-019182] N83-30193
High Energy Astrophysics Laboratory Contributions to the 18th International Cosmic Ray Conference
[NASA-TM-85034] N83-30351
GAS ANALYSIS
Mechanisms and kinetics of coal hydrogenation
[DE82-016296] N83-29331
GAS COMPOSITION
Development of alcohol-based synthetic transportation fuels from coal-derived synthesis gases
[DE83-004857] N83-29434
GAS DYNAMICS
Non-steady gas dynamic effects in the induction domain behind a strong shock wave
[CA-8229] N83-29633
GAS FLOW
Graphite ablation in several gas environments
[AD-A125511] N83-29319
Convective heat transfer in internal gas flows with temperature-dependent properties
[AD-A125901] N83-29640
GAS IONIZATION
Basic studies of gases for fast switches
[AD-A126343] N83-29618
GAS JETS
Effect of liquid droplets on turbulence structure in a round gaseous jet N83-29215
A gas jet impacting a cavity N83-29627
GAS LASERS
Bibliography of Soviet laser developments, no. 55, September - October 1981
[AD-A126022] N83-29686
Bibliography of Soviet laser developments, no. 56, November - December 1981
[AD-A126023] N83-29687
Microwave conditioned dc discharges for excitation of rare-gas-halide lasers
[AD-A126222] N83-29694
GAS PRESSURE
Basic studies of gases for fast switches
[AD-A126343] N83-29618
GAS TUNGSTEN ARC WELDING
Process parameter effects on arc physics and heat flow in GTAW
[DE82-017269] N83-29717
GAS TURBINE ENGINES
Fuel vaporization effects N83-29214
Dilution zone mixing N83-29216
Rotor fragment protection program: Statistics on aircraft gas turbine engine rotor failures that occurred in US commercial aviation during 1979
[NASA-CR-168163] N83-29234
Applications of a compression system stability model N83-29260
An overview of engine dynamic response and mathematical modeling concepts N83-29262
Generalized digital simulation technique with variable engine parameter input for steady state and transient behaviour of aero gas turbines N83-29263
Techniques for determining engine stall recovery characteristics N83-29265
Reactions of NaCl with gaseous SO3, SO2, and O2
[NASA-TM-83423] N83-29358
Gas turbine parts made of injection molded silicon nitride and brazing of silicon nitride with metal
[BMFT-FB-T-83-028] N83-29377
Development of ceramic automobile turbine engine components
[BMFT-FB-T-83-025] N83-29407
Development of high-temperature resistant, noncorrosible, nonmetallic ceramic materials, especially silicon nitride, for heat exchangers in gas turbine application
[BMFT-FB-T-83-026] N83-29408
Research to develop and evaluate advanced eddy current sensors for detecting small flaws in metallic aerospace components
[AD-A125873] N83-29726
GAS TURBINES
Combustion Fundamentals Research
[NASA-CP-2268] N83-29208
Small gas turbine combustor primary zone study N83-29221
Gas turbines for the production of electrical and thermal energy
[AD-A126182] N83-29239
Gas turbine parts made of injection molded silicon nitride
[BMFT-FB-T-83-021] N83-29240
Experience with the KHD APU T312 for a modern fighter type N83-29251
Mechanical and thermal effects on the transient and steady state component performance of gas turbines N83-29252
Turbine tip clearance control in gas turbine engines N83-29254
Improvements in the dynamic simulation of gas turbines N83-29264
Evaluation of synthetic-fuel-character effects on rich-lean stationary-gas-turbine combustion systems. Volume 1: Subscale test program
[DE83-901452] N83-29715
Applications of composite gas-turbine components, phase 1
[DE83-006574] N83-29718
GASEOUS FUELS
Alternative fuel technology series. Volume 2: Comparative properties of conventional and alternative fuels
[ISBN-0-902937-66-9] N83-29411
GASEOUS ROCKET PROPELLANTS
Studies about alternative propellants for ion propulsion systems N83-29436
GASES
Venturi design for metering solids flow in gas-solids suspensions
[DE83-004314] N83-29660
Ionizing potential waves in preionized gases
[AD-A126286] N83-30179
GASIFICATION
Progress in studies on catalyzed gasification of wood
[DE83-009124] N83-29332
GASOHOL (FUEL)
Materials compatibility studies with fuel/alcohol mixtures
[AD-A126076] N83-29416
Low-energy process to extract anhydrous ethanol from fermentation beers
[DE83-005012] N83-29419
Alcohol-Fuels Grant Program. Low-energy route for alcohol/gasohol recovery from fermentor beer
[DE83-009665] N83-29423
GASOLINE
Evaluation of fuel additives for reduction of material imcompatibilities in methanol-gasoline blends
[NASA-CR-168061] N83-29359
Materials compatibility studies with fuel/alcohol mixtures
[AD-A126076] N83-29416
Alcohol-Fuels Grant Program. Low-energy route for alcohol/gasohol recovery from fermentor beer
[DE83-009665] N83-29423
Development of alcohol-based synthetic transportation fuels from coal-derived synthesis gases
[DE83-004857] N83-29434
GATES (CIRCUITS)
Camel gate field effect transistors
[AD-A125942] N83-29608
GAUGE THEORY
Rare kaon decays at LAMPF 2
[DE82-019191] N83-30187
GEARS
Vibration in planetary gear systems with unequal planet stiffnesses
[NASA-TM-83426] N83-29709
GENERAL AVIATION AIRCRAFT
Multi-fuel rotary engine for general aviation aircraft
[NASA-TM-83429] N83-29235
Design, implementation and flight testing of PIF autopilots for general aviation aircraft
[NASA-CR-3709] N83-29270
GENETICS
Genetic danger of non-thermal intensity microradio waves and its hygienic aspects N83-29967
GEOBOTANY
An evaluation of LANDSAT-4 thematic mapper data for their geometric and radiometric accuracies and their relevance to geologic mapping N83-29765
Utilization of LANDSAT multispectral data in geobotanical investigations: The location of ironstone gravel in the Sam Houston National Forest
[E83-10361] N83-29772
GEOCHEMISTRY
Organic geochemistry of deep ground waters --- Washington state and Sweden
[DE83-005333] N83-29787
Publications of the exobiology program for 1982. A special bibliography
[NASA-TM-85837] N83-30041
GEODESY
Geodetic distance measuring apparatus
[NASA-CASE-GSC-12609-2] N83-29681
Space research activities in the German Democratic Republic N83-29743
GEODETIC SATELLITES
The use of synthetic aperture radar to detect and chart submerged navigation hazards
[AD-A126071] N83-29567
GEODETIC SURVEYS
The influence of reference system disparity on navigation and positioning
[AD-A125546] N83-29195
GEOGRAPHIC INFORMATION SYSTEMS
Agricultural land cover mapping in the context of a geographically referenced digital information system --- Carroll, Macon, and Gentry Counties, Missouri
[E83-10357] N83-29768
Three-dimensional perspective software for representation of digital imagery data --- Olympic National Park, Washington
[E83-10359] N83-29770
Meaning and construction of a geographic base file for a spatially oriented information system
[PB83-166108] N83-29961
GEOGRAPHY
Advanced type placement and geonames databases: Comprehensive coordination plan
[AD-A126241] N83-30299
GEOLOGICAL SURVEYS
LANDSAT-4 hightlights N83-29755

Hydrogeochemical and stream sediment reconnaissance basic data for Bangor and Bath quadrangles, Maine
[DE83-005630] N83-29788
GEOLOGY
Mississippi Deltaic Plain Region ecological characterization: An ecological atlas. Map narratives
[PB83-157669] N83-29890
Roede formation: Early old red sandstone facies in the Silurian of Jaemtland Sweden
[PB83-165621] N83-29917
GEOMAGNETISM
ELF PVS field strength measurements, April 1977
[AD-A126212] N83-29574
Investigation of the effects of external current systems on the MAGSAT data utilizing grid cell modeling techniques
[E83-10358] N83-29769
Electromagnetic deep-probing (100-1000 kms) of the Earth's interior from artificial satellites: Constraints on the regional emplacement of crustal resources
[E83-10363] N83-29774
Japanese MAGSAT team
[E83-10366] N83-29777
International Catalog of Geomagnetic Data
[PB83-161679] N83-29921
GEOMETRIC ACCURACY
Evaluation of LANDSAT-4 TM and MSS ground geometry performance without ground control
[E83-10338] N83-29749
TM report N83-29757
Impact of LANDSAT MSS sensor differences on change detection analysis N83-29759
Thematic mapper intraband radiometric performance N83-29764
An evaluation of LANDSAT-4 thematic mapper data for their geometric and radiometric accuracies and their relevance to geologic mapping N83-29765
GEOMETRIC RECTIFICATION (IMAGERY)
Evaluation of the radiometric quality of the TM data using clustering and multispectral distance measures N83-29762
GEOMETRICAL OPTICS
EHF dielectric lens antenna for Satellite Communication Systems
[AD-A126214] N83-29578
GEOMETRY
Initial Graphics Exchange Specification (IGES), version 2.0
[PB83-137448] N83-30092
A finite flag-transitive geometry of extended G2-type
[MC-ZW-176/82] N83-30141
Neutral beam heating in stellarators: A numerical approach
[DE83-010458] N83-30242
GEOPHYSICS
Magma source location survey
[DE82-019816] N83-29908
Cross-borehole fracture mapping using electromagnetic geotomography
[DE82-012699] N83-29910
Geophysical monitoring for climatic change
[PB83-159905] N83-29948
Solar-geophysical data comprehensive reports. Part 2: Data for May 1982, June 1980 and miscellanea. Explanation of data reports issued as Number 450 (supplement) February 1982
[PB83-162065] N83-30332
GEOPOTENTIAL
Analytical nonsingular theory for geopotential perturbations including resonance effects
[DFVLR-FB-82-28] N83-29915
GEOSTROPHIC WIND
Vertical sections of temperature, salinity, thermosteric anomaly, and zonal geostrophic velocity from Norpax shuttle experiment, part 3
[PB83-169961] N83-29960
GEOTHERMAL RESOURCES
Assessment of the geothermal resources of Kansas. Volume 2, section 2: Appendices
[DE83-003221] N83-29786
Evaluation of low-temperature geothermal potential in Cache Valley, Utah
[DE83-001219] N83-29790
Hydrodynamic/kinetic reactions in liquid-dominated geothermal systems
[DE82-017287] N83-29814
Geothermal-reservoir assessment and confirmation program for direct-heat applications in Colorado
[DE83-009816] N83-29836
Summary and results of the comprehensive environmental monitoring program at the INEL's Raft River geothermal site
[DE83-005583] N83-29879
Correlation between precision gravity and subsidence measurements at Cerro Prieto
[DE83-005870] N83-29907
GLASS
Glass batch preheater, phase 3
[PB83-167254] N83-29478
GLOBAL AIR POLLUTION
Geophysical monitoring for climatic change
[PB83-159905] N83-29948
GLOBAL POSITIONING SYSTEM
Navigation: National plans; NAVSTAR-GPS; Laser gyros
[AD-A125533] N83-29194
The influence of reference system disparity on navigation and positioning
[AD-A125546] N83-29195
GLOBULAR CLUSTERS
Globular clusters and X-ray bursters
[PR-764] N83-30333
GLUONS
Glueballs: A status report
[DE82-009519] N83-30188
GLYCOLS
Measured performance results: Low-cost solar water heating systems in the San Luis Valley
[DE83-006488] N83-29831
GOVERNMENT/INDUSTRY RELATIONS
Automated Weather Information Systems (AWIS): Considerations for intra- and intersystem operations and interagency considerations in development and coordination of AWIS
[PB83-159848] N83-29949
GOVERNMENTS
Local governments LANDSAT applications program
[E83-10364] N83-29775
MEDLARS and health information policy
[PB83-168658] N83-30318
GRAIN BOUNDARIES
Hydrogen attack of bainitic 2 1/4 Cr-1Mo steel
[DE82-019169] N83-29370
Grain-boudary-diffusion mechanisms in metals
[DE82-018814] N83-30280
GRAINS (FOOD)
Controlled Ecological Life Support System. First Principal Investigators Meeting
[NASA-CP-2247] N83-30016
Studies on maximum yield of wheat and other small grains in controlled environments N83-30024
GRANITE
Simple strength tests on and hydraulic fracturing of rock material
[PB83-165514] N83-29918
GRANULAR MATERIALS
Carbon granule probe microphone for leak detection
[NASA-CASE-NPO-16027-1] N83-29595
GRAPHITE
SEM/TEM fractography of composite materials
[AD-A125832] N83-29317
Graphite ablation in several gas environments
[AD-A125511] N83-29319
Nonequilibrium disclinations in the carbonaceous mesophase
[AD-A125807] N83-29395
GRAPHITE-EPOXY COMPOSITES
Performance of a quantitative study of instability-related delamination growth
[NASA-CR-166046] N83-29314
The effect of extreme temperatures on the elastic properties and fracture behavior of graphite/polyimide composites
[NASA-CR-172143] N83-29315
GRAPHS (CHARTS)
International energy indicators, February - March 1982
[DE82-014879] N83-29824
GRATINGS (SPECTRA)
Grating beam combiner
[AD-A125456] N83-29692
GRAVELS
Utilization of LANDSAT multispectral data in geobotanical investigations: The location of ironstone gravel in the Sam Houston National Forest
[E83-10361] N83-29772
GRAVITATIONAL EFFECTS
Attitude dynamics and stability of large flexible structures in orbit N83-29729
Analytical nonsingular theory for geopotential perturbations including resonance effects
[DFVLR-FB-82-28] N83-29915
GRAVITY ANOMALIES
Cavity detection and delineation research. Part 4: Microgravimetric survey: Manatee Springs Site, Florida
[AD-A125900] N83-29906
GRIDS
Analytical calculation of a single jet in cross-flow and comparison with experiment N83-29219
GROUND EFFECT
V/STOL fountain force coefficient
[AD-A126261] N83-29200
GROUND STATE
Actionometry in monochromatic flash photolysis: The extinction coefficient of triplet benzophenone and quantum yield of triplet zinc tetraphenyl porphyrin
[DE83-006819] N83-29345
GROUND STATIONS
Radar modeling of space diversity associated with slant path rain attenuation at variable path angles, frequencies, and drop size distributions N83-29551
Site diversity in Earth to satellite links: Radar measurements and theoretical predictions N83-29552
GROUND SUPPORT EQUIPMENT
Operational engine usage N83-29246
GROUND TESTS
Ground test experience with large composite structures for commercial transports
[NASA-TM-84627] N83-29732
GROUND WATER
Organic geochemistry of deep ground waters --- Washington state and Sweden
[DE83-005333] N83-29787
Hydrogeochemical and stream sediment reconnaissance basic data for Bangor and Bath quadrangles, Maine
[DE83-005630] N83-29788
Evaluation of low-temperature geothermal potential in Cache Valley, Utah
[DE83-001219] N83-29790
Ground water quality in southeastern Minnesota
[PB83-154377] N83-29800
Water resources data for Puerto Rico, 1979-1980
[PB83-159483] N83-29802
GROWTH
Structure and growth process of vapor-grown carbon fibers
[NASA-TM-77046] N83-29313
GUIDANCE (MOTION)
Guidance and actuation techniques for an adaptively controlled vehicle
[AD-A126296] N83-30037
GUN PROPELLANTS
Sensitivity characterization of low vulnerability (LOVA) propellants
[AD-A126130] N83-29415
GUNN EFFECT
Integrated optical transmitter and receiver
[AD-A125493] N83-29575
GYPSUM
In-progress absolute radiometric inflight calibration of the LANDSAT-4 sensors N83-29763
GYROSCOPES
Navigation: National plans; NAVSTAR-GPS; Laser gyros
[AD-A125533] N83-29194

H

HABITABILITY
Land-related global habitability science issues
[NASA-TM-85841] N83-29744
HADRONS
Hadronic Press monographs in theoretical physics, no. 2. Admissible approach to the hadronic structure. Volume 2: Covering of the Galilei and Einstein relativities?
[DE83-007251] N83-30160
New-particle spectroscopy, quarkonium and gluonic mesons
[DE83-007012] N83-30203
Particle physics experiments, 1981
[PB83-164715] N83-30207
Survey of models of baryon production in e plus e minus annihilation
[PB83-166850] N83-30212
HAIL
Attenuation of radio waves by atmospheric wet ice and mixed phased hydrometeors N83-29553
HALIDES
Spectroscopic investigations of materials for tunable infrared lasers
[AD-A125538] N83-29689
HALL EFFECT
Microelectronic position sensors
[BMFT-FB-T-83-034] N83-29375
HALOGENS
Gem-difluoroallylilithium: Preparation by lithium-halogen exchange and utilization in organosilicon and organic synthesis
[AD-A126094] N83-29328
Molecular beam chemistry: Reactions of oxygen atoms with halogen molecules
[AD-A125870] N83-30175

HAMILTON-JACOBI EQUATION
Versatile three-dimensional Hamiltonian ray-tracing computer program for acoustic waves in the atmosphere
[PB83-149930] N83-30170
HANDBOOKS
Wear particle atlas, revised
[AD-A125512] N83-29402
Terminal forecast reference notebook for RAF Fairford, United Kingdom
[AD-A126095] N83-29930
HARDNESS
Structure and properties of nickel-boron-layers
[BMFT-FB-T-82-241] N83-29374
HARMONIC GENERATIONS
Multiphoton ionization and third-harmonic generation in atoms and molecules
[DE82-015748] N83-30185
HARMONIC GENERATORS
Resonantly enhanced vacuum-ultraviolet generation and multiphoton ionization in carbon monoxide gas
[DE82-012147] N83-30183
HARTREE APPROXIMATION
A review of quantum Monte Carlo methods and results for Coulombic systems
[DE83-006570] N83-30155
HAWAII
Intermediate photovoltaic system application experiment operational performance report for G. N. Wilcox Memorial Hospital, Kauai, Hawaii for October 1982, volume 6
[DE83-006415] N83-29834
HAZARDS
Earthquakes and earthquake predictions: Simulating their economic effects
[PB83-163725] N83-29939
Feasibility study of mitigating tsunami hazards in the Pacific
[PB83-156885] N83-29966
HEAD (ANATOMY)
Biomechanics of head tolerance criteria — impact injuries
[NPL-DMA(A)64] N83-29990
An engineering assessment of head tolerance criteria
[NPL-DMA(A)63] N83-30015
HEALTH
Problems of studying the biological effect of electromagnetic fields discussed N83-29976
HEAO 2
Einstein X-ray observations of cataclysmic variables
[DE82-015804] N83-30352
HEAT EXCHANGERS
International survey of the status of technology of critical components for coal-liquefaction processes
[DE82-015236] N83-29339
Development of high-temperature resistant, noncorrosible, nonmetallic ceramic materials, especially silicon nitride, for heat exchangers in gas turbine application
[BMFT-FB-T-83-026] N83-29408
Measured performance results: Low-cost solar water heating systems in the San Luis Valley
[DE83-006488] N83-29831
HEAT FLUX
Hot-electron distribution function in high-Z materials
[DE82-008109] N83-30282
HEAT PIPES
High thermal power density heat transfer apparatus providing electrical isolation at high temperature using heat pipes
[NASA-CASE-LEW-12950-2] N83-29804
HEAT PUMPS
Model of the steady-state performance of an absorption heat pump
[PB83-152314] N83-29471
Solar assisted gas-fired absorption heat pump
[PB83-167502] N83-29477
Combined-cycle heat pump analysis program
[PB83-161042] N83-29483
Magnetic heat pumping
[NASA-CASE-LEW-12508-3] N83-29625
Feasibility of night-sky radiation with heat pumps
[DE83-006812] N83-29850
Solar energy system performance evaluation. Crown Realty 1, Lakewood, Colorado, December 1981 through March 1982
[DE82-019029] N83-29855
HEAT RESISTANT ALLOYS
Considerations of technology transfer barriers in the modification of strategic superalloys for aircraft turbine engines
[NASA-TM-83395] N83-29360
Effect of the test environment on creep crack growth rates for nickel base alloys. A study of creep crack growth in 2219-T851 aluminum alloy using a computerized testing system
[AD-A125698] N83-29361
HEAT SOURCES
Process parameter effects on arc physics and heat flow in GTAW
[DE82-017269] N83-29717
Feasibility of a free-standing insertable heat source
[DE82-014207] N83-29867
Finite-element approach to analyzing coupled thermal-hydraulic problems
[DE83-007565] N83-30139
HEAT STORAGE
An experimental study of single media thermocline thermal-energy storage
[DE82-006769] N83-29823
The 10-MWe central-receiver solar-thermal pilot-plant test operation plan
[DE83-009737] N83-29843
Solar storage for process heat and building application: A review of prior assessments
[DE82-019791] N83-29857
An assessment of second-generation compressed-air energy-storage concepts
[DE82-019513] N83-29859
HEAT STROKE
Survey and analysis of the heat casualty prevention experiment for Resphiblex 1-81, operation 'Lancer Eagle', 43D, MAU
[AD-A125847] N83-30004
HEAT TRANSFER
Models for predicting tip clearance changes in gas turbines N83-29255
Axial compressor characteristics during transients N83-29259
Experimental polyurethane foam roof systems, part 2
[AD-A126315] N83-29453
Measurement of pressure-velocity correlations in turbulent reacting flows N83-29628
Energy transport in porous-insulator systems. 2: Performance of vertical enclosures
[DE82-019894] N83-29643
High thermal power density heat transfer apparatus providing electrical isolation at high temperature using heat pipes
[NASA-CASE-LEW-12950-2] N83-29804
Forced- and natural-convection studies on solar collectors for heating and cooling applications
[DE83-009863] N83-29841
Heat and mass extraction from solar ponds: Analysis and development of a laboratory facility
[DE82-013888] N83-29856
The wedge hot-film anemometer in supersonic flow
[NASA-TP-2134] N83-30164
HEAT TRANSMISSION
Process parameter effects on arc physics and heat flow in GTAW
[DE82-017269] N83-29717
Hot-electron distribution function in high-Z materials
[DE82-008109] N83-30282
HEAT TREATMENT
Removal of hydrogen from plated high strength steel by baking: A statistically designed study
[AD-A126100] N83-29366
Microstructure and fatigue behavior of 3 nickel base eutectic composites
[AD-A125571] N83-29369
Applications of composite gas-turbine components, phase 1
[DE83-006574] N83-29718
HEATING
A gas jet impacting a cavity N83-29627
Emissions and fuel economy of the Kat's engine block heater device
[PB83-165548] N83-29724
HEATING EQUIPMENT
Glass batch preheater, phase 3
[PB83-167254] N83-29478
Residential combustion heating system performance analysis study
[PB83-161406] N83-29481
HEAVY IONS
Design analysis and performance evaluation of a two-dimensional camera for accelerated positron-emitter beam injection by computer simulation
[DE83-005866] N83-29661
Selective non-resonant acceleration of 3He++ and heavy ions by H+ cyclotron waves
[NASA-CR-172820] N83-30182
Probing the nuclear structure with heavy-ion reactions
[DE82-017316] N83-30195
Topics in heavy ion reactions
[PB83-164939] N83-30210
HEAVY WATER
New pulsed far infrared laser lines in D2O
[IPF-82-13] N83-29701
HELICOPTER DESIGN
Army helicopter improvement program's future may depend on success in controlling cost
[PB83-168187] N83-29202
HELICOPTERS
Validation flight test of UH-60A for Rotorcraft Systems Integration Simulator (RSIS)
[AD-A125428] N83-29201
Army helicopter improvement program's future may depend on success in controlling cost
[PB83-168187] N83-29202
CAD of control systems: Application of nonlinear programming to a linear quadratic formulation
[NASA-CR-172151] N83-29448
Emergency Medical Service (EMS): Rotorcraft Technology Workshop
[NASA-CR-166495] N83-30325
HELIOSTATS
Manufacturing and cost analyses of heliostats based on the second-generation heliostat-development study
[DE83-006664] N83-29835
The 10-MWe central-receiver solar-thermal pilot-plant test operation plan
[DE83-009737] N83-29843
HELIUM
Semiconductor measurement technology: Graphical solution for the helium leak detector and radioisotope methods of hermetic test, master graphs and instructions
[PB83-146845] N83-29672
HELIUM IONS
Selective non-resonant acceleration of 3He++ and heavy ions by H+ cyclotron waves
[NASA-CR-172820] N83-30182
HELIUM-NEON LASERS
Propagation of visible and infrared radiation in fog, rain, and snow
[AD-A126062] N83-29899
Influence of prolonged illumination of the rabbit retina by monochromatic light on its functional state N83-29979
HELMETS
Evaluation of high performance aircrew helmets and oxygen masks
[AD-A126036] N83-30038
HEMODYNAMIC RESPONSES
State of hepatic circulation in response to combined effect of lead and electromagnetic fields N83-29982
HERBICIDES
Design and development of a disc-windmill atomizer for aerial applications
[AE-8223] N83-29449
Atomizers for the aerial application of herbicides: Ideal and available
[CA-8207] N83-29632
HERMETIC SEALS
Semiconductor measurement technology: Graphical solution for the helium leak detector and radioisotope methods of hermetic test, master graphs and instructions
[PB83-146845] N83-29672
HETEROGENEITY
A simple derivation of the formula to calculated synthetic long-period seismograms in a heterogeneous Earth by normal mode summation
[NASA-CR-172818] N83-29893
HETEROJUNCTIONS
Experimental studies of lateral electron transport in gallium arsenide-aluminum gallium arsenide heterostructures
[AD-A125858] N83-30275
HEURISTIC METHODS
A minimal technology routing system
[AD-A126079] N83-30122
Spacefilling curves and routing problems in the plane
[AD-A126309] N83-30125
HIGH ASPECT RATIO
Wind-tunnel investigation of aerodynamic loading on a 0.237-scale model of a remotely piloted research vehicle with a thick, high-aspect-ratio supercritical wing
[NASA-TM-84614] N83-29176
HIGH ENERGY INTERACTIONS
Limits on neutrino-antineutrino transitions from a study of high energy neutrino interactions
[PB83-165944] N83-30213
HIGH FREQUENCIES
Propagation anomalies in a 4.7 and 11 GHz line of sight path N83-29504
Amplitude scintillation in propagation paths above 10 GHz N83-29508
Rapid annealing in advanced bipolar microcircuits
[DE82-018772] N83-29616
Metabolism of the brain and liver after experimental exposure to super high-frequency fields of non-thermal intensity N83-29981

HIGH LEVEL LANGUAGES
International Workshop on High-level Language Computer Architecture
[AD-A126223] N83-30043
Delayed binding in PQCC generated compilers
[AD-A125935] N83-30044
Compiler features: A survey
[PB83-164418] N83-30046
CODASYL Query Language Flat (CQLF) specifications
[PB83-164376] N83-30088
HIGH SPEED
Design of a high-speed digital processing element for parallel simulation
[NASA-TM-83373] N83-29597
HIGH STRENGTH STEELS
Effect of microstructure and internal hydrogen on fatigue crack propagation of ultrahigh strength steels
N83-29357
HIGH TEMPERATURE
Elastomer toughened polyimide adhesives
[NASA-LAR-12775-2] N83-29390
HIGH TEMPERATURE ENVIRONMENTS
Daze fasteners
[NASA-CASE-LAR-13009-1] N83-29706
HIGH VOLTAGES
High voltage isolation transformer
[NASA-CASE-GSC-12817-1] N83-29590
High voltage power supply
[NASA-CASE-GSC-12818-1] N83-29594
HIGHWAYS
Field environmental evaluation plan for sulfur use in pavements
[PB83-156687] N83-29461
Synthesis of frictional requirements research
[PB83-156315] N83-29466
HILBERT SPACE
Multidimensional signal restoration and band-limited extrapolation, 2
[AD-A125877] N83-29583
HILSCH TUBES
A gas jet impacting a cavity N83-29627
HOLES (ELECTRON DEFICIENCIES)
Probing the nuclear structure with heavy-ion reactions
[DE82-017316] N83-30195
HOMOMORPHISMS
On language families generated by commutative languages
[ISSN-0355-0087] N83-30051
HORIZONTAL ORIENTATION
Results of free yaw tests of the Mod-O 100 kilowatt wind turbine
[NASA-TM-83432] N83-29813
Maintenance-free 100 ampere-hour, lead acid battery for deep discharge, photovoltaic applications
[DE82-018633] N83-29821
HORMONES
Chronic consumption of a low sodium diet: Hormonal and physiological effects during exercise in the heat
[AD-A124936] N83-29997
HOSPITALS
Intermediate photovoltaic system application experiment operational performance report for G. N. Wilcox Memorial Hospital, Kauai, Hawaii for October 1982, volume 6
[DE83-006415] N83-29834
HOT ELECTRONS
Hot-electron distribution function in high-Z materials
[DE82-008109] N83-30282
HOT PRESSING
Silicon carbide alloys
[AD-A125968] N83-29398
Pressure sintering and creep deformation: A joint modeling approach — ceramics
[DE83-006516] N83-29738
HOT-WIRE FLOWMETERS
Turbulence spectra in the noise source regions of the flow around complex surfaces
[NASA-TM-83392] N83-30168
HUBS
Development of monoflar rotor hub vibration absorber
[NASA-CR-166088] N83-29272
HUMAN BEINGS
Problems of studying the biological effect of electromagnetic fields discussed N83-29976
Toxicology Information Response Center: A ten-year perspective
[DE82-017430] N83-30005
HUMAN FACTORS ENGINEERING
Post-flight interview with Berezevoy and Lebedev
N83-29281
Voice-communication testing using naive and experienced communicators
[AD-A126109] N83-29568
An engineering assessment of head tolerance criteria
[NPL-DMA(A)63] N83-30015
Natural artifical languages: Low-level processes
[AD-A125800] N83-30063
HUMAN PERFORMANCE
Effects of some motion sickness suppressants on tracking performance during angular accelerations
[AD-A123839] N83-29994
The event related brain potential as an index of information processing, cognitive activity, and skill acquisition: A program of basic research
[AD-A125699] N83-29999
Components of individual differences in human intelligence
[AD-A125633] N83-30012
Display-control compatibility in 3-D displays. 2: Effects of cue symmetry
[AD-A125806] N83-30036
Modeling and analysis of teams of interacting decisionmakers with bounded rationality
[AD-A125582] N83-30298
HUMAN TOLERANCES
Biomechanics of head tolerance criteria — impact injuries
[NPL-DMA(A)64] N83-29990
An engineering assessment of head tolerance criteria
[NPL-DMA(A)63] N83-30015
HUMIDITY
Analysis of the adsorption process and of desiccant cooling systems: A pseudo- steady-state model for coupled heat and mass transfer
[DE83-005752] N83-29828
HUMIDITY MEASUREMENT
Satellite moisture retrieval techniques. Volume 1: Technique development and evaluation
[AD-A126245] N83-29933
HURRICANES
Prediction of hurricane storm surges: A state-of-the-art survey
[PB83-163915] N83-29946
HYDRAULIC EQUIPMENT
Mod-2 wind turbine system development. Volume 1: Executive summary
[NASA-CR-168006] N83-29812
Finite-element approach to analyzing coupled thermal-hydraulic problems
[DE83-007565] N83-30139
HYDRAULICS
Calculation of unsaturated hydraulic conductivity
[DE82-016325] N83-29876
HYDRAZINES
Environmental fate of hydrazine fuels in aqueous and soil environments
[AD-A125813] N83-29870
HYDROCARBONS
Identification and comparative genotoxicity of polycyclic aromatic hydrocarbons and related nitrogen-containing heteroatomic species in products from coal liquefaction processes
[DE83-006939] N83-29312
Superacids as catalysts for selected hydrocarbon convers
[PB83-166546] N83-29353
Oil from plants
[DE83-009141] N83-29846
Molecular biology of environmental aromatic hydrocarbons
[DE82-016978] N83-29875
HYDRODYNAMIC EQUATIONS
Three dimensional modeling of shock initiation of heterogeneous explosives
[DE82-006145] N83-29426
HYDRODYNAMICS
Combustion Fundamentals Research
[NASA-CP-2268] N83-29208
Numerical simulation for droplet combustion using Lagrangian hydrodynamics N83-29210
Hydrodynamic/kinetic reactions in liquid-dominated geothermal systems
[DE82-017287] N83-29814
Wavelength scaling of the two-plasmon decay and stimulated Raman-scattering instabilities
[DE83-007905] N83-30202
HYDROGEN
A review of quantum Monte Carlo methods and results for Coulombic systems
[DE83-006570] N83-30155
HYDROGEN EMBRITTLEMENT
Effect of microstructure and internal hydrogen on fatigue crack propagation of ultrahigh strength steels
N83-29357
Removal of hydrogen from plated high strength steel by baking: A statistically designed study
[AD-A126100] N83-29366
Hydrogen attack of bainitic 2 1/4 Cr-1Mo steel
[DE82-019169] N83-29370
HYDROGEN FUELS
Operating experience with a liquid-hydrogen fueled Buick and refueling system
[DE82-008113] N83-29716
HYDROGEN IONS
Selective non-resonant acceleration of 3He++ and heavy ions by H+ cyclotron waves
[NASA-CR-172820] N83-30182
HYDROGEN PRODUCTION
Recovery of hydrogen from hydrogen sulfide: Bench scale studies of the reaction of hydrogen sulfide with liquid copper
[DE83-005947] N83-29336
Synfuel from fusion: Using the tandem mirror reactor and a thermochemical cycle to produce hydrogen
[DE83-005216] N83-29424
SERI Biomass Program
[DE83-009763] N83-29845
HYDROGEN SULFIDE
Mechanisms and kinetics of coal hydrogenation
[DE82-016296] N83-29331
Recovery of hydrogen from hydrogen sulfide: Bench scale studies of the reaction of hydrogen sulfide with liquid copper
[DE83-005947] N83-29336
HYDROGENATION
Mechanisms and kinetics of coal hydrogenation
[DE82-016296] N83-29331
HYDROGRAPHY
Derivation of catchment average unit hydrograph
[PB83-164574] N83-29797
Airborne laser hydrography, FY 1983. Issue paper
[PB83-158451] N83-29964
HYDROLOGY
Mechanical, thermal, and fluid transport properties of rock at depth
[DE82-016008] N83-29912
Physical considerations in the analysis and synthesis of hydrologic sequences
[PB83-167593] N83-29938
Mean monthly, seasonal and annual pan evaporation for the United States
[PB83-161729] N83-29942
HYDROLOGY MODELS
Derivation of catchment average unit hydrograph
[PB83-164574] N83-29797
HYDROLYSIS
The hydrolysis of phosphate esters on solids
[AD-A126119] N83-29329
HYDROMETALLURGY
Recovery of sulfur and accessory metals from a leaching process residue
[PB83-157651] N83-29383
HYDROMETEOROLOGY
Attenuation of radio waves by atmospheric wet ice and mixed phased hydrometeors N83-29553
HYDROPONICS
Candidate species selection: Cultural and photosynthetic aspects N83-30022
HYDROTHERMAL SYSTEMS
Recovery of tungsten from a hydrothermally altered deposit. Report of investigations, 1982
[PB83-157719] N83-29381
HYDROXIDES
Spectroscopic properties of metal monoxides and hydroxides important in the ionosphere
[AD-A126332] N83-29905
HYPERFINE STRUCTURE
High-resolution laser and rf spectroscopy of atomic and molecular beams
[DE83-008942] N83-29699
HYPEROXIA
Workshop on Detection and Measurement of Pulmonary Oxygen Toxicity
[AD-A125821] N83-30003
HYPERSONIC WIND TUNNELS
Pressure distributions obtained on a 0.04-scale and 0.02-scale model of the Space Shuttle Orbiter's forward fuselage in the Langley continuous flow hypersonic tunnel
[NASA-TM-84630] N83-29278
HYPOTHERMIA
Treatment of hypothermia in a seaman following the shipwreck of a coastal motorship
[DRIC-T-6835] N83-29988
HYPOTHESES
Non-parametric statistical software for the TRS-80 microcomputer
[AD-A126055] N83-30073

I

IBM COMPUTERS
International Workshop on High-level Language Computer Architecture
[AD-A126223] N83-30043
ICE
Attenuation of radio waves by atmospheric wet ice and mixed phased hydrometeors N83-29553

ICE ENVIRONMENTS
East Antarctic ice sheet surface contours from satellite radar altimetry, a demonstration
[PB83-166397] N83-29796
ICE FORMATION
Satellite observation of Great Lakes ice: 1980-81
[PB83-156877] N83-29795
A new characterization of supercooled clouds below 10,000 feet AGL (Above Ground Level)
[FAA-CT-83-22] N83-29922
Direct observation of time-temperature-transformation curves for crystallization of ice from solutions by a homogeneous mechanism
[AD-A126044] N83-30279
ICE MAPPING
Satellite observation of Great Lakes ice: 1980-81
[PB83-156877] N83-29795
IGNITION
Spontaneous ignition characteristics of hydrocarbon fuel-air mixtures N83-29231
ILLUMINATING
Semiconductor electrodes. 50: Effect of mode of illumination and doping on photoelectrochemical behavior of phthalocyanine films
[AD-A125856] N83-30274
ILLUMINATION
A field visibility comparison between electroluminescent sources and standard US Coast Guard incandescent aids-to-navigation sources
[AD-A125575] N83-30223
IMAGE ANALYSIS
Image-enhancement applications at the Lawrence Livermore National Laboratory
[DE82-019312] N83-30086
On the characterization of simple closed surfaces in 3-dimensional digital images
[AD-A125573] N83-30116
Entropy and information in the design and analysis of imaging systems N83-30221
IMAGE ENHANCEMENT
Image-enhancement applications at the Lawrence Livermore National Laboratory
[DE82-019312] N83-30086
IMAGE MOTION COMPENSATION
PDSS/IMC requirements and functional specifications
[NASA-CR-170801] N83-30055
IMAGE PROCESSING
Water penetration photogrammetry. Volume 1: Feasibility and evaluation study
[AD-A126209] N83-29291
Multi-dimensional signal procesing research program
[AD-A126333] N83-29580
Optical signal processing
[AD-A125609] N83-29599
Evaluation of LANDSAT-4 TM and MSS ground geometry performance without ground control
[E83-10338] N83-29749
Impact of LANDSAT MSS sensor differences on change detection analysis N83-29759
Thermal band characterization of LANDSAT-4 thematic mapper N83-29761
Three-dimensional perspective software for representation of digital imagery data — Olympic National Park, Washington
[E83-10359] N83-29770
The 1980 land cover for the Puget Sound region
[E83-10360] N83-29771
Local governments LANDSAT applications program
[E83-10364] N83-29775
Cross-borehole fracture mapping using electromagnetic geotomography
[DE82-012699] N83-29910
Evaluation of the tropical cyclone spiral linearization technique
[AD-A126007] N83-29934
Understanding objects, features and backgrounds
[AD-A125514] N83-30013
Image processing and digitization facility
[AD-A126307] N83-30074
DIDA: Dynamic Image Disparity Analysis
[AD-A126327] N83-30080
Image-enhancement applications at the Lawrence Livermore National Laboratory
[DE82-019312] N83-30086
IMAGE RECONSTRUCTION
ART and SIRT correction factors in geotomography — algebraic reconstruction technique (ART); simultaneous iterative reconstruction technique (SIRT) N83-29539
Stability improvements in geotomographic inversion methods N83-29540
IMAGE RESOLUTION
Effects of the atmosphere on image resolution in microwave radiometry N83-29530
SEASAT synthetic-aperture radar data user's manual
[E83-10321] N83-29746
LANDSAT-4 Scientific Characterization: Early Results Symposium
[E83-10356] N83-29754
Investigation of radiometric properties of LANDSAT-4 MSS N83-29758
IMAGERY
Foreign technology alert-bibliography: Photography and recording devices. Citations from the NTIS data base
[PB83-101626] N83-29676
IMAGES
Image-enhancement applications at the Lawrence Livermore National Laboratory
[DE82-019312] N83-30086
On the characterization of simple closed surfaces in 3-dimensional digital images
[AD-A125573] N83-30116
Object detection by two-dimensional linear prediction
[AD-A126340] N83-30128
IMAGING TECHNIQUES
Use of a priori information for improved tomographic imaging in coded-aperture systems N83-30220
Entropy and information in the design and analysis of imaging systems N83-30221
X-ray imaging mirror system and method of producing the same
[NASA-CASE-NPO-15828-1] N83-30222
Focusing and imaging sharp line X-ray and gamma-ray sources using variable-metric diffraction crystals
[DE83-007789] N83-30285
Ferroelectric thin films for imaging and signaling techniques
[BMFT-FB-T-83-015] N83-30287
IMMOBILIZATION
Chemical modification of carbon electrodes
[AD-A125964] N83-29327
IMMUNOLOGY
Action of industrial frequency electric field on indicators of natural immunity N83-29984
IMPACT
Investigation of crew restraint system biomechanics
[AD-A126199] N83-29190
Spray impaction, retention and adhesion: An introduction to basis characteristics
[CA-8215] N83-29394
IMPACT DAMAGE
Full-scale turbine-missile-casing tests
[DE83-007427] N83-29310
IMPACT TESTS
Shock sensitivity of the explosive 2-(5-cyanotetrazolato) pentaamine cobalt(3) perchlorate (CP)
[DE82-013637] N83-29429
IMPACT TOLERANCES
Biomechanics of head tolerance criteria — impact injuries
[NPL-DMA(A)64] N83-29990
IMPERIAL VALLEY (CA)
Evaluation of LANDSAT-4 TM and MSS ground geometry performance without ground control
[E83-10338] N83-29749
IMPLANTATION
Electroactive polymers as antistatic materials
[AD-A126102] N83-29400
IMPLOSIONS
Modeling of imploded annular plasmas
[AD-A126179] N83-30238
IMPURITIES
Dye laser fluorescence spectroscopy on the doublet 3 Tokamak
[DE82-017575] N83-29338
Materials characterization of silicon and analysis of recombination processes and impurities
[BMFT-FB-T-83-06] N83-30291
INCANDESCENCE
A field visibility comparison between electroluminescent sources and standard US Coast Guard incandescent aids-to-navigation sources
[AD-A125575] N83-30223
INCIDENT RADIATION
X-ray imaging mirror system and method of producing the same
[NASA-CASE-NPO-15828-1] N83-30222
INCOMPRESSIBLE FLUIDS
Flow in a partially filled rotating cylinder — as applied to gas centrifuges utilized for isotope separation
[DE82-018309] N83-29644
INCONEL (TRADEMARK)
Microfissuring of Inconel 718
[NASA-TM-82531] N83-29356
Microstructure and fatigue behavior of 3 nickel base eutectic composites
[AD-A125571] N83-29369
INDEPENDENT VARIABLES
Evaluation of the tropical cyclone spiral linearization technique
[AD-A126007] N83-29934
INDEXES (DOCUMENTATION)
Foreign technology alert-bibliography: Ceramics, refractories and glass technology
[PB83-101642] N83-29323
Scientific and technical information output of the Langley Research Center for calendar year 1982
[NASA-TM-84615] N83-30306
EIA Data Index: An abstract journal. Third supplement, Jul.-Dec. 1981
[DE83-006533] N83-30311
INDIA
Proceedings of a National Seminar on Energy Challenge of the Eighties
[PB83-164764] N83-29442
INDIAN SPACE PROGRAM
USSR-India cooperative space programs N83-29288
INDIUM COMPOUNDS
Dye laser fluorescence spectroscopy on the doublet 3 Tokamak
[DE82-017575] N83-29338
INDUCTION HEATING
Induction heating gun
[NASA-CASE-LAR-13181-1] N83-29591
INDUCTION MOTORS
Three phase power factor controller
[NASA-CASE-MFS-25535-2] N83-29593
INDUSTRIAL ENERGY
Intermediate photovoltaic system application experiment operational performance report. Volume 6: CDC Light Manufacturing Bldg., San Bernardino, CA for August 1982
[DE83-010390] N83-29844
INDUSTRIAL PLANTS
Manufacturing and cost analyses of heliostats based on the second-generation heliostat-development study
[DE83-006664] N83-29835
INDUSTRIAL SAFETY
Effect of industrial frequency electric field (50 Hz) on metabolism of copper, iron and metalloenzymes bound to them (experimental research) N83-29985
INDUSTRIAL WASTES
Methanol from landfill gas: Technology and economics
[PB83-169144] N83-29443
Environmental assessment data base for petroleum refining wastewaters and residuals
[PB83-164749] N83-30316
INDUSTRIES
Titanium: Past, present, and future
[PB83-171132] N83-29386
INELASTIC SCATTERING
Design of neutron streak camera for fusion diagnostics
[DE82-018393] N83-29662
Folding models for elastic and inelastic scattering
[DE82-013458] N83-30189
Nuclear structure in pion scattering and charge exchange
[DE83-007945] N83-30205
Topics in heavy ion reactions
[PB83-164939] N83-30210
INERTIA
Polyvinyl alcohol battery separator containing inert filler
[NASA-CASE-LEW-13556-2] N83-29805
INERTIAL CONFINEMENT FUSION
Fusion Energy Workshop
[PUBL-97-128] N83-30236
INERTIAL FUSION (REACTOR)
Inertial fusion: An energy-production option for the future
[DE82-019245] N83-30250
INERTIAL GUIDANCE
MX systems study
[AD-A126083] N83-29296
INFERENCE
The 3 papers on rule-based estimation of statistics on databases
[AD-A126198] N83-30310
INFORMATION DISSEMINATION
Satellite freeze forecast system
[E83-10369] N83-29779
Mississippi Deltaic Plain Region ecological characterization: An ecological atlas. Map narratives
[PB83-157669] N83-29890
Informational technology and its impact on American education
[PB83-174664] N83-30296
Management of reference information services: A dynamic resource allocation and simulation model
[DE82-019879] N83-30312
MEDLARS and health information policy
[PB83-168658] N83-30318

INFORMATION FLOW
Informational technology and its impact on American education
[PB83-174664] N83-30296
INFORMATION MANAGEMENT
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172906] N83-30054
Classification systems in information and documentation. Possibilities of further development
[BMFT-FB-ID-83-003] N83-30314
INFORMATION RETRIEVAL
Integration of new technology in Army libraries
[AD-A125983] N83-30307
MEDLARS and health information policy
[PB83-168658] N83-30318
Distributed information delivery system. Design manual, version 1.0
[PB83-148809] N83-30321
Distributed information delivery system module descriptions, version 1.0
[PB83-156703] N83-30322
INFORMATION SYSTEMS
Joint Services Electronics Program, Stanford University
[AD-A126140] N83-29602
Automated hourly weather collective from HRR data input
[PB83-167122] N83-29943
Automated Weather Information Systems (AWIS): Considerations for intra- and intersystem operations and interagency considerations in development and coordination of AWIS
[PB83-159848] N83-29949
Data source and information carrier as a base for a spatial-orientated information system
[PB83-166090] N83-29962
Forestry information systems and terminology
[PB83-156158] N83-30315
INFORMATION THEORY
Entropy and information in the design and analysis of imaging systems N83-30221
Informational technology and its impact on American education
[PB83-174664] N83-30296
Modeling and analysis of teams of interacting decisionmakers with bounded rationality
[AD-A125582] N83-30298
INFRARED DETECTORS
Infrared detection of microwave induced surface currents on flat plates
[AD-A126207] N83-30227
Quality of inspections utilizing infrared technology on weatherization retrofit installations
[PB83-146936] N83-30234
Advanced methods for preparation and characterization of infrared detector materials
[NASA-CR-170798] N83-30271
INFRARED LASERS
Search for far infrared radiation from optically pumped defect modes
[AD-A125940] N83-29685
Spectroscopic investigations of materials for tunable infrared lasers
[AD-A125538] N83-29689
Propagation of visible and infrared radiation in fog, rain, and snow
[AD-A126062] N83-29899
INFRARED RADIATION
Exploration of new methods to produce efficient sources of coherent near millimeter wave radiation
[AD-A125772] N83-29559
Energy transport in porous-insulator systems. 2: Performance of vertical enclosures
[DE82-019894] N83-29643
Remote sensing of surface propagation parameters: Application of imagery simulation model results
[AD-A125513] N83-29785
High-power generation of microwave and infrared radiation
[AD-A125953] N83-30161
Infrared radiation and inversion population of CO2 laser levels in Venusian and Martian atmospheres
[NASA-TM-85057] N83-30341
Infrared molecular emissions from comets
[NASA-TM-85067] N83-30344
INFRARED RADIOMETERS
Radiometric sensing of the atmospheric boundary layer N83-29533
INFRARED SPECTROSCOPY
Exploration of new methods to produce efficient sources of coherent near millimeter wave radiation
[AD-A125772] N83-29559
INFRARED TRACKING
Satellite infrared observations of oceanic long waves in the Eastern Equatorial Pacific 1975 to 1981
[PB83-161133] N83-29963
INGOTS
Titanium: Past, present, and future
[PB83-171132] N83-29386
INHIBITION
Evaluation of in-package performance of antistatic materials
[AD-A126118] N83-29714
INHOMOGENEITY
Scatter of elastic waves by a thin flat elliptical inhomogeneity
[NASA-CR-3705] N83-29725
INITIATORS (EXPLOSIVES)
Shock sensitivity of the explosive 2-(5-cyanotetrazolato) pentaamine cobalt(3) perchlorate (CP)
[DE82-013637] N83-29429
INJECTION MOLDING
Gas turbine parts made of injection molded silicon nitride
[BMFT-FB-T-83-021] N83-29240
Gas turbine parts made of injection molded silicon nitride and brazing of silicon nitride with metal
[BMFT-FB-T-83-028] N83-29377
INLET FLOW
Modelling compression component stability characteristics: Effects of inlet distortion and fan bypass duct disturbances N83-29261
NBS portable ambient particulate sampler
[PB83-165019] N83-29679
INLET TEMPERATURE
A look at engine handling aspects from aircraft flight test experience; with an outlook for future requirements N83-29245
INLETS (TOPOGRAPHY)
Tidal inlet response to jetty construction
[AD-A112448] N83-29950
INPUT/OUTPUT ROUTINES
Communication environments for local networks
[AD-A125441] N83-29573
INSOLATION
Intermediate photovoltaic system application experiment operational performance report. Lovington Square Shopping Center, Lovington, New Mexico for November 1982, volume 17
[DE83-006721] N83-29849
INSPECTION
Numerical calculations of ultrasonic fields
[DE82-013811] N83-30169
INSTALLING
Manufacturing and cost analyses of heliostats based on the second-generation heliostat-development study
[DE83-006664] N83-29835
INSTRUCTION SETS (COMPUTERS)
Design of a high-speed digital processing element for parallel simulation
[NASA-TM-83373] N83-29597
INSTRUMENT ORIENTATION
Optical orientation in space N83-29282
INSULATORS
Energy transport in porous-insulator systems. 2: Performance of vertical enclosures
[DE82-019894] N83-29643
INTAKE SYSTEMS
The criteria used for assessing acceptable engine handling on UK military aircraft N83-29244
A look at engine handling aspects from aircraft flight test experience; with an outlook for future requirements N83-29245
Effects of intake flow distortion on engine stability N83-29257
Test facility for basic research on distortion N83-29258
INTEGRAL EQUATIONS
Mechanical properties of the spinal ligaments of primates. Part 1: Cyclic loading. Part 2: Mathematical modeling
[AD-A125540] N83-29968
Least-square iterative technique for solving time-domain scattering problems
[PB83-164913] N83-30143
INTEGRATED CIRCUITS
Potential benefits of a Full Authority Digital Electronic Control (FADEC) installed on a TF30 engine in an F14 flight test demonstrator aircraft N83-29269
The development of refractory metallization for high-speed VISI circuits
[AD-A125783] N83-29598
Large-scale circuit simulation
[AD-A125941] N83-29607
Camel gate field effect transistors
[AD-A125942] N83-29608
Restructurable VLSI program
[AD-A126216] N83-29611
Layout algorithms for the design of very large scale integrated circuits using partitioning
[BMFT-FB-T-83-018] N83-29620
External development and production of integrated circuits
[BMFT-FB-T-83-022] N83-29621
Integrated circuits for optical sensing and display techniques
[BMFT-FB-T-83-052] N83-29622
Leadless chip carrier packaging and CAD/CAM (Computer-Aided Design/Computer-Aided Manufacturing) supported wire wrap interconnect technology for subnanosecond ECL (Emitter Coupled Logic)
[AD-A126156] N83-30277
Methods of submicron analysis as assistance for semiconductor technology
[BMFT-FB-T-83-032] N83-30288
INTEGRATED OPTICS
Integrated optical transmitter and receiver
[AD-A125493] N83-29575
INTELLIGENCE
Components of individual differences in human intelligence
[AD-A125633] N83-30012
INTELLIGIBILITY
Voice-communication testing using naive and experienced communicators
[AD-A126109] N83-29568
INTERACTIONS
Helicopter-borne scatterometer
[AD-A125796] N83-29581
INTERFACES
Continued development of the Universal Network Interface Device
[AD-A126031] N83-29569
INTERFACIAL TENSION
Fluid dynamic experiment in a surface tension tank: Phase 1/Phase 2A
[BMFT-FB-W-83-002] N83-29649
INTERFERENCE
Coding for frequency-hopped spread-spectrum channels with partial-band interference
[AD-A125872] N83-29582
INTERFEROMETERS
Optically Recording Velocity Interferometer System (ORVIS) for subnanosecond particle-velocity measurements in shock waves
[DE82-017621] N83-29659
INTERFERON
Microwaves and human leukocyte function
[AD-A124000] N83-29998
INTERNAL WAVES
The interaction of short-wavelength internal waves with a background current
[AD-A125822] N83-29581
INTERNATIONAL COOPERATION
USSR-India cooperative space programs N83-29286
INTERPLANETARY FLIGHT
Robots on Venus N83-29283
INTERPLANETARY MAGNETIC FIELDS
Solar-geophysical data prompt reports. Part 1: Data for October 1982, September 1982 and late data. Explanation of data reports issued as number 450 (Supplement) February 1982
[PB83-162057] N83-30331
INTERPOLATION
Toward a metrology for precision-machine-tool control systems
[DE82-018077] N83-29458
On the permanence property in spherical spline interpolation
[AD-A126263] N83-30121
Summary of rules for sampling, decimation, and interpolation of experimental data
[DE82-016360] N83-30313
INVERSE SCATTERING
Non-self-adjoint inverse spectral theoretic derivation of a complex von Nuemann-Wigner potential
[DE83-009064] N83-30137
INVERSIONS
Stability improvements in geotomographic inversion methods N83-29540
INVISCID FLOW
Finite area method for nonlinear supersonic conical flows
[NASA-CR-172148] N83-29177
IO
Io escape and ionization of atmospheric gases
[NASA-CR-172885] N83-30336
ION ACCELERATORS
Ion acceleration in the plasma focus
[IPF-82-6] N83-30257
ION BEAMS
Density and potential measurements in an intense ion-beam-generated plasma
[DE82-018803] N83-30248

ION EXCHANGE RESINS
Preconcentration methods for trace element determination
[PB83-172536] N83-29351
ION EXCHANGING
Investigations of vacuum ultraviolet and soft X-ray lasers
[AD-A125558] N83-29690
Mineral separation in a CELSS by ion-exchange chromatography N83-30033
ION IMPLANTATION
Microelectronic position sensors
[BMFT-FB-T-83-034] N83-29375
ION PROPULSION
Studies about alternative propellants for ion propulsion systems N83-29436
ION SOURCES
Optical pumping for intense polarized ion sources
[DE82-012136] N83-30231
ION TEMPERATURE
Laser-fluorescence measurements of hydrogen and metal densities in the doublet 3 Tokamak
[DE83-008499] N83-30251
IONIZATION
Resonantly enhanced vacuum-ultraviolet generation and multiphoton ionization in carbon monoxide gas
[DE82-012147] N83-30183
Electron-impact ionization: Time-dependent and other numerical approaches
[DE82-017517] N83-30198
IONIZATION CHAMBERS
Radiation standards and calibrations
[DE82-019748] N83-30200
IONIZATION CROSS SECTIONS
Photoionization research on atomic radiation. 3: The ionization cross section of atomic nitrogen
[NASA-TM-77107] N83-30172
Photoionization research on atomic beams. 2: The photoionization cross section of atomic oxygen
[NASA-TM-77106] N83-30173
IONIZATION POTENTIALS
Ionizing potential waves in preionized gases
[AD-A126286] N83-30179
IONOGRAMS
Automatic scaling of digisonde ionograms test and evaluation report
[AD-A125830] N83-30064
Processing of digital ionograms
[AD-A125831] N83-30065
IONOSONDES
Automatic scaling of digisonde ionograms test and evaluation report
[AD-A125830] N83-30064
IONOSPHERE
Space research activities in the German Democratic Republic N83-29743
Coordinated ground-based measurements at Chatanika: Auroral spatial and temporal structures
[AD-A126113] N83-29900
UV emissions and the electron density in the auroral and low to mid-latitude daytime ionospheres
[AD-A126318] N83-29901
IONOSPHERIC CURRENTS
Investigation of the effects of external current systems on the MAGSAT data utilizing grid cell modeling techniques
[E83-10358] N83-29769
Japanese MAGSAT team
[E83-10366] N83-29777
IONOSPHERIC DRIFT
Geophysical plasmas and atmospheric modeling
[AD-A126341] N83-29904
IONOSPHERIC ELECTRON DENSITY
Automatic scaling of digisonde ionograms test and evaluation report
[AD-A125830] N83-30064
IONOSPHERIC PROPAGATION
ELF PVS field strength measurements, April 1977
[AD-A126212] N83-29574
IRON
Effect of industrial frequency electric field (50 Hz) on metabolism of copper, iron and metalloenzymes bound to them (experimental research) N83-29985
IRON CHLORIDES
An electrochemical rebalance cell for Redox systems
[NASA-TM-83363] N83-29326
IRON COMPOUNDS
Relative catalytic activity of iron containing minerals for the hydrogasification of coal
[DE82-012776] N83-29337
IRRADIATION
Radiation-induced microstructural changes in Ni-C and Pt-C alloys
[DE83-007815] N83-29371
Laser-activated electrical switching characteristics of high-current, low-loss thermionic diodes
[AD-A125521] N83-29609
Effect of cordiamine and mesatone on ECG under conditions of acute microwave irradiation N83-29977
Metabolism of the brain and liver after experimental exposure to super high-frequency fields of non-thermal intensity N83-29981
Effect of industrial frequency electric field (50 Hz) on metabolism of copper, iron and metalloenzymes bound to them (experimental research) N83-29985
Genetic danger of non-thermal intensity microradio waves and its hygienic aspects N83-29987
ISOLATION
High thermal power density heat transfer apparatus providing electrical isolation at high temperature using heat pipes
[NASA-CASE-LEW-12950-2] N83-29804
ISOTHERMAL PROCESSES
Stirling engine design manual, 2nd edition
[NASA-CR-158088] N83-30328
ISOTOPE SEPARATION
Flow in a partially filled rotating cylinder — as applied to gas centrifuges utilized for isotope separation
[DE82-018309] N83-29644
Lasers in chemical processing
[DE82-016134] N83-29700
ISOTOPIC ENRICHMENT
Nuclear-spectroscopy problems studied with neutrons
[DE82-017303] N83-30192
ITERATION
Subsonic panel method for designing wing surfaces from pressure distribution
[NASA-CR-3713] N83-29198
Model of the steady-state performance of an absorption heat pump
[PB83-152314] N83-29471
Multidimensional signal restoration and band-limited extrapolation, 2
[AD-A125877] N83-29583
Least-square iterative technique for solving time-domain scattering problems
[PB83-164913] N83-30143
ITERATIVE SOLUTION
Parabolized Navier-Stokes solutions of separation and trailing-edge flows
[NASA-TM-84378] N83-29635
A preconditioned formulation of the Cauchy-Riemann equations
[NASA-CR-172156] N83-30107
Preconditioned minimal residual methods for Chebyshev equations
[NASA-CR-172157] N83-30111
IUE
First three years of IUE (International Ultraviolet Explorer satellite)
[PB83-166496] N83-30337
Detailed observations of NGC 4151 with IUE (International Ultraviolet Explorer). Paper 2: Variability of the continuum from 1978 February to 1980 May, including X-ray and optical observations
[PB83-164947] N83-30338

J

JACKETS
Full-scale turbine-missile-casing tests
[DE83-007427] N83-29310
JAMMING
USAF (United States Air Force) avionics master plan
[AD-A125819] N83-29205
Angle of arrival estimation
[AD-A126038] N83-29571
Jam resistant communications systems techniques
[AD-A126217] N83-29579
Coding for frequency-hopped spread-spectrum channels with partial-band interference
[AD-A125872] N83-29582
JAPAN
Japanese MAGSAT team
[E83-10366] N83-29777
JET AIRCRAFT
LC Science Tracer Bullet: Jet engines and jet aircraft
[TB-82-5] N83-29207
Engine Handling
[AGARD-CP-324] N83-29241
Study of an automatic trajectory following control system
[NASA-CR-166121] N83-29271
JET ENGINES
LC Science Tracer Bullet: Jet engines and jet aircraft
[TB-82-5] N83-29207
Dilution jet experiments in compact combustor configurations N83-29218
Effects of intake flow distortion on engine stability N83-29257
Improving the accuracy of thermocouple temperature measuring circuits — jet engines
[PNR-90148] N83-29670
JET FLOW
Influence of a large free stream disturbance level on dynamics of a jet in a cross flow N83-29217
Analytical calculation of a single jet in cross-flow and comparison with experiment N83-29219
JET MIXING FLOW
Dilution zone mixing N83-29216
JUNCTIONS
Superconducting niobium thin-film gradiometer technology program
[AD-A126133] N83-29656
JUPITER (PLANET)
Planetary atmospheres program
[NASA-CR-172879] N83-30339

K

K LINES
Time-resolved X-ray line diagnostics of laser-produced plasmas
[DE82-015165] N83-30249
KALMAN FILTERS
Development and evaluation of a Kalman-filter algorithm for terminal area navigation using sensors of moderate accuracy
[NASA-TP-2035] N83-29193
KANSAS
Assessment of the geothermal resources of Kansas. Volume 2, section 2: Appendices
[DE83-003221] N83-29786
KAONS
Rare kaon decays at LAMPF 2
[DE82-019191] N83-30187
KARST
Ground water quality in southeastern Minnesota
[PB83-154377] N83-29800
KIDNEYS
Facility for in-vivo measurement of lithium
[DE83-007388] N83-30006
KINEMATICS
Computer simulation and control of underwater vehicles
[PB83-150532] N83-29462
Parabolized Navier-Stokes solutions of separation and trailing-edge flows
[NASA-TM-84378] N83-29635
KINETIC ENERGY
Spray impaction, retention and adhesion: An introduction to basis characteristics
[CA-8215] N83-29394
Capability of surface-based clear-air Doppler radar for monitoring meteorological properties in elevated layers N83-29549
Formation of quark-gluon plasma in nuclear collisions
[DE82-018521] N83-30184
Folding models for elastic and inelastic scattering
[DE82-013458] N83-30189
KINETICS
Fast computational kinetics program N83-29227
KNUDSEN FLOW
Diffusion-flame studies of the chemical and physical mechanisms of soot formation from aromatic and substituted-aromatic fuels
[DE83-009093] N83-29334
KRIGING
Comparison of linear and nonlinear random field estimators
[PB83-169755] N83-30145

L

LABYRINTH SEALS
The matrix of axial and radial plays: The present situation and perspectives — turbojet engines N83-29253
LAKE ICE
Satellite observation of Great Lakes ice: 1980-81
[PB83-156877] N83-29795
LAMINAR FLOW
Convective heat transfer in internal gas flows with temperature-dependent properties
[AD-A125901] N83-29640
Thresholds for the onset of fluid and magnetofluid turbulence
[DE82-017202] N83-29542
LAMINATES
Performance of a quantitative study of instability-related delamination growth
[NASA-CR-166046] N83-29314

Laminate analyses, micromechanical creep response, and fatigue behavior of polymer matrix composite materials
[AD-A125784] N83-29316
SEM/TEM fractography of composite materials
[AD-A125832] N83-29317
Cumulative damage model for advanced composite materials
[AD-A126048] N83-29318

LAND USE
Land-related global habitability science issues
[NASA-TM-85841] N83-29744
Use of remote sensing for land use policy formulation
[E83-10326] N83-29747
LANDSAT-4 hightlights N83-29755
The 1980 land cover for the Puget Sound region
[E83-10360] N83-29771
Local governments LANDSAT applications program
[E83-10364] N83-29775
Application of SEASAT-1 Synthetic Aperture Radar (SAR) data to enhance and detect geological lineaments and to assist LANDSAT landcover classification mapping — Appalachian Region, West Virginia
[E83-10365] N83-29776

LANDFILLS
Methanol from landfill gas: Technology and economics
[PB83-169144] N83-29443

LANDSAT SATELLITES
Interactive analysis of a large aperture Earth observations satellite
[NASA-TM-85638] N83-29304

LANDSAT 4
Evaluation of LANDSAT-4 TM and MSS ground geometry performance without ground control
[E83-10338] N83-29749
LANDSAT-4 Scientific Characterization: Early Results Symposium
[E83-10356] N83-29754
LANDSAT-4 evaluation program and scientific characterization activities N83-29756
TM report N83-29757
Investigation of radiometric properties of LANDSAT-4 MSS N83-29758
Spectral characterization of the LANDSAT-4 thematic mapper sensors N83-29760
Thermal band characterization of LANDSAT-4 thematic mapper N83-29761
Evaluation of the radiometric quality of the TM data using clustering and multispectral distance measures N83-29762
In-progress absolute radiometric inflight calibration of the LANDSAT-4 sensors N83-29763
An evaluation of LANDSAT-4 thematic mapper data for their geometric and radiometric accuracies and their relevance to geologic mapping N83-29765
Spatial resolution estimation of LANDSAT-4 TM and MSS data N83-29766

LANGUAGES
Natural artifical languages: Low-level processes
[AD-A125800] N83-30063

LAPLACE EQUATION
A compact finite difference scheme for div(Rho grad u) - q2u = 0
[NASA-CR-172165] N83-30112

LARGE SCALE INTEGRATION
Layout algorithms for the design of very large scale integrated circuits using partitioning
[BMFT-FB-T-83-018] N83-29620
A distributed network supporting ocean surveillance
[AD-A125559] N83-29954

LARGE SPACE STRUCTURES
Interactive analysis of a large aperture Earth observations satellite
[NASA-TM-85638] N83-29304
Development of deployable structures for large space platform systems, volume 2
[NASA-CR-170800] N83-29305
Induction heating gun
[NASA-CASE-LAR-13181-1] N83-29591

LASER APPLICATIONS
Velocity visualization in gaseous flows N83-29223
Dual laser optical system and method for studying fluid flow
[NASA-CASE-MFS-25315-1] N83-29680
Bibliography of Soviet laser developments, no. 56, November - December 1981
[AD-A126023] N83-29687
Kinetic studies of gas phase free radicals
[AD-A125516] N83-29688
Lasers in chemical processing
[DE82-016134] N83-29700
Airborne laser hydrography, FY 1983. Issue paper
[PB83-158451] N83-29964
Resonantly enhanced vacuum-ultraviolet generation and multiphoton ionization in carbon monoxide gas
[DE82-012147] N83-30183
Wavelength scaling of the two-plasmon decay and stimulated Raman-scattering instabilities
[DE83-007905] N83-30202
Studying electron distributions using the time-resolved free-bound spectra from coronal plasmas
[DE83-006569] N83-30241

LASER FUSION
Design of neutron streak camera for fusion diagnostics
[DE82-018393] N83-29662
Inertial fusion: An energy-production option for the future
[DE82-019245] N83-30250
Spatially and spectraly resolved filamentary structures in the (3/2)omega 0 emission from laser produced plasmas
[PB83-165969] N83-30264
Laser-fusion (for pedestrians)
[PB83-166470] N83-30265

LASER MODE LOCKING
Geodetic distance measuring apparatus
[NASA-CASE-GSC-12609-2] N83-29681

LASER MODES
Beam-profile measurement of laser pulses using a spatial filter to sample the hermite modes for a string of pulses
[PB83-156612] N83-29702

LASER OUTPUTS
Start-up of a pulsed beam Free Electron Laser (FEL) oscillator
[AD-A126306] N83-29684
Performance of laser beam wavefront sensor
[AD-A125432] N83-29691
Grating beam combiner
[AD-A125456] N83-29692
Multiple scattering effects in aerosols: Theoretical investigations
[AD-A125480] N83-29693
Microwave conditioned dc discharges for excitation of rare-gas-halide lasers
[AD-A126222] N83-29694
A system for measuring energy and peak power of low-level 1.064 micrometer laser pulses
[PB83-165027] N83-29703
Beam-profile measurement of laser pulses using a spatial filter to sample the hermite modes for a string of pulses
[PB83-164996] N83-29705
Propagation of visible and infrared radiation in fog, rain, and snow
[AD-A126062] N83-29899
Modelling of the 10-micrometer natural laser emission from the mesospheres of Mars and Venus
[NASA-TM-85045] N83-30342

LASER PLASMAS
Optical-scattering measurements from 1.06-micron, 0.53-micron, and 0.35-micron laser-heated disk targets
[DE82-015418] N83-30232
Time-resolved X-ray line diagnostics of laser-produced plasmas
[DE82-015165] N83-30249
Spatially and spectraly resolved filamentary structures in the (3/2)omega 0 emission from laser produced plasmas
[PB83-165969] N83-30264

LASER RANGE FINDERS
Selection of repetition frequencies for laser rangefinders
[AD-A126188] N83-29695

LASER RANGER/TRACKER
Plate tectonic behaviour in the east Mediterranean region to be detected by baseline variations from satellite laser ranging
[PB83-159772] N83-29920

LASER SPECTROSCOPY
High-resolution laser and rf spectroscopy of atomic and molecular beams
[DE83-008942] N83-29699
New pulsed far infrared laser lines in D2O
[IPF-82-13] N83-29701

LASER TARGETS
Design of neutron streak camera for fusion diagnostics
[DE82-018393] N83-29662
Optical pumping for intense polarized ion sources
[DE82-012136] N83-30231

LASERS
Investigations of vacuum ultraviolet and soft X-ray lasers
[AD-A125558] N83-29690
Quantum dynamical model for laser excitation of a two-level adatom: Surface-dressed Bloch equations
[AD-A126201] N83-29696

LATEX
Latex improvement of recycled asphalt pavement
[PB83-152694] N83-29460

LATTICES (MATHEMATICS)
Convergence characteristics of nonlinear vortex-lattice methods for configuration aerodynamics
[NASA-TM-84371] N83-29181

LAW (JURISPRUDENCE)
Air disaster litigation
[GPO-97-336] N83-29185

LAWS
Projections of lawless sequences
[MATH-CENTRE-TRACTS-152] N83-30104

LEACHING
Line-sinter processing of anorthosite for the recovery of alumina
[PB83-148435] N83-29379
Recovery of sulfur and accessory metals from a leaching process residue
[PB83-157651] N83-29383

LEAD ACID BATTERIES
Maintenance-free 100 ampere-hour, lead acid battery for deep discharge, photovoltaic applications
[DE82-018633] N83-29821

LEADING EDGE SWEEP
Predictions of entry heating for lower surface of shuttle orbiter
[NASA-TM-84624] N83-29631

LEADING EDGES
A numerical study of Strake aerodynamics
[AD-A125882] N83-29182
Piezoelectric deicing device
[NASA-CASE-LEW-13773-1] N83-29197
Nonuniqueness in wakes and boundary layers
[UTRC83-15] N83-29630
Numerical simulation of vortex breakdown by the vortex-filament method
[NASA-TM-84334] N83-29636

LEAKAGE
Carbon granule probe microphone for leak detection
[NASA-CASE-NPO-16027-1] N83-29595
Semiconductor measurement technology: Graphical solution for the helium leak detector and radioisotope methods of hermetic test, master graphs and instructions
[PB83-146845] N83-29672

LEAST SQUARES METHOD
Multi-dimensional signal procesing research program
[AD-A126333] N83-29580
Derivation of catchment average unit hydrograph
[PB83-164574] N83-29797
Restrained least-squares program (RESLSQ) users manual
[AD-A126171] N83-30082
A recursive estimator and stability of a class of time varying difference equations
[PB83-167213] N83-30138
Least-square iterative technique for solving time-domain scattering problems
[PB83-164913] N83-30143

LEGAL LIABILITY
Increased automobile fuel efficiency and synthetic fuels. Alternatives for reducing oil imports. Background paper 5: Water availability for synthetic fuels: An assessment of current studies
[PB83-152645] N83-29437

LEGENDRE FUNCTIONS
Legendre-Tau approximations for functional differential equations
[NASA-CR-172155] N83-30106

LENS ANTENNAS
EHF dielectric lens antenna for Satellite Communication Systems
[AD-A126214] N83-29578

LENSES
Environmental degradation of solar optical materials. Volume 1: Literature survey
[DE83-010298] N83-29837

LEPTONS
Introduction to the possible substructure of quarks and leptons
[PB83-165605] N83-30211

LETHALITY
Dependence of biological effects of microwave irradiation on exposure intensity and duration N83-29980

LEUKOCYTES
Microwaves and human leukocyte function
[AD-A124000] N83-29998

LEVELING
Automatic detection of loops in leveling networks
[PB83-154641] N83-29801

LIBRARIES
Integration of new technology in Army libraries
[AD-A125983] N83-30307

Integration of new technology in Army libraries, appendices
[AD-A125984] N83-30308
Management of reference information services: A dynamic resource allocation and simulation model
[DE82-019879] N83-30312
Notes for medical catalogers, 1982
[PB83-170860] N83-30317
MEDLARS and health information policy
[PB83-168658] N83-30318

LIE GROUPS
Hadronic Press monographs in theoretical physics, no. 2. Admissible approach to the hadronic structure. Volume 2: Covering of the Galilei and Einstein relavities?
[DE83-007251] N83-30160

LIFE (DURABILITY)
Engine Handling
[AGARD-CP-324] N83-29241
Operational engine usage N83-29246
Corrosion control: Why the laboratory needs to be involved
[PB83-152009] N83-29380
The duration period of propellants for classical and rocket armament
[AD-A126219] N83-29417
Latex improvement of recycled asphalt pavement
[PB83-152694] N83-29460
Epoxy thermoplastic pavement marking material: Summary of research results and revised specifications
[PB83-164848] N83-29475
Study of high power L-band space transmitters for 2nd generation INMARSAT
[SCR-518(PSL-83-159)] N83-29490
Elastomeric bearings design, construction and materials
[PB83-149211] N83-29723
Innovation for maintenance technology improvements
[PB83-149450] N83-29728
Czechoslovak Journal of Physics (selected articles)
[AD-A126183] N83-30162

LIFE CYCLE COSTS
Some general topics in the field of engine handling N83-29242

LIFE SCIENCES
USSR report: Life sciences. Effects of nonionizing electromagnetic radiation, no. 10
[JPRS-83745] N83-29973

LIFE SUPPORT SYSTEMS
Controlled Ecological Life Support System. First Principal Investigators Meeting
[NASA-CP-2247] N83-30016
Current concepts of the CELSS program N83-30017
The CELSS program: An overview of its structure and use of computer modelling N83-30018
CELSS system control overview N83-30019
Control problems in autonomous life support systems N83-30020
Development of selection criteria and their application in evaluation of CELSS candidate species N83-30021
Candidate species selection: Cultural and photosynthetic aspects N83-30022
Selection of crop varieties for efficient production using urea, ammonia, nitrite, and nitrate in cells N83-30025
To produce nutrients for plant growth N83-30027
Food systems for PCELSS N83-30028
Generic waste management requirements for a Controlled Ecological Life Support System (CELSS) N83-30029
Some issues in comparability of results and analytical methodology in CELSS waste processing research N83-30031
Mineral separation in a CELSS by ion-exchange chromatography N83-30033

LIGAMENTS
Mechanical properties of the spinal ligaments of primates. Part 1: Cyclic loading. Part 2: Mathematical modeling
[AD-A125540] N83-29968

LIGHT (VISIBLE RADIATION)
The generation of near millimeter radiation by picosecond pulse demodulation
[AD-A125510] N83-29576

LIGHT EMITTING DIODES
Planar optical sources and detectors for monolithic integration with GaAs MESFET electronics
[DE82-010896] N83-29615
Integrated circuits for optical sensing and display techniques
[BMFT-FB-T-83-052] N83-29622

LIGHT SCATTERING
Diffusion-flame studies of the chemical and physical mechanisms of soot formation from aromatic and substituted-aromatic fuels
[DE83-009093] N83-29334
Circular differential scattering is an important part of the circular dichroism of macromolecules
[DE83-007022] N83-29405
Scattering by spheroidal and rough particles
[AD-A125767] N83-29558
Multiple scattering effects in aerosols: Theoretical investigations
[AD-A125480] N83-29693
Optical-scattering measurements from 1.06-micron, 0.53-micron, and 0.35-micron laser-heated disk targets
[DE82-015418] N83-30232

LIGHT SOURCES
Automatic focussing devices for photographic cameras
[PB83-155275] N83-29674

LIGHT TRANSMISSION
Propagation of visible and infrared radiation in fog, rain, and snow
[AD-A126062] N83-29899
Multiple scattering effects on transmission through the atmosphere
[AD-A126010] N83-30226

LIGNITE
Transco medium-Btu coal gasification project. Executive summary
[DE82-009598] N83-29418

LIMITS (MATHEMATICS)
Submodular set functions, matroids and the greedy algorithm: Tight worst-case bounds and some generalizations of the Rado-Edmonds theorem
[AD-A124981] N83-30134

LINE OF SIGHT
Experimental study of propagation characteristics in millimeter wave region N83-29517
Steady state performance of survivable routing procedures for circuit-switched mixed-media networks
[AD-A126213] N83-29610

LINE OF SIGHT COMMUNICATION
The PACEM experiment on line of sight multipath propagation --- propagation in clear air and meteorology (PACEM) N83-29499
Measurements of radio refractive index profiles in tropical and equatorial regions and their influence on line of sight microwave links N83-29503
Propagation anomalies in a 4.7 and 11 GHz line of sight path N83-29504
Amplitude scintillation in propagation paths above 10 GHz N83-29508

LINE SPECTRA
Quark-antiquark bound-state spectroscopy and QCD
[DE83-007062] N83-30204

LINEAR ARRAYS
An application of digital extrapolation in array processing
[AD-A125871] N83-30229

LINEAR EQUATIONS
The 3 papers on rule-based estimation of statistics on databases
[AD-A126198] N83-30310

LINEAR PROGRAMMING
Linear programming and finite Markovian control problems
[MATH-CENTRE-TRACTS-148] N83-30050
A successive linear programming method and its convergence on nonlinear problems
[AD-A126240] N83-30070
An enhanced conversion scheme for lexicographic, multiobjective integer programs
[AD-A125527] N83-30077
Measures of value in a linear-programming model of the US energy system
[DE83-006685] N83-30087
A saddle value characterization of Fan's equilibrium points
[AD-A126237] N83-30120
Efficient tree handling procedures for allocation/processing networks
[AD-A126238] N83-30156
Invariant multiplicative efficiency and piecewise Cobb-Douglas envelopments
[AD-A126239] N83-30157

LINEAR SYSTEMS
Study of high power L-band space transmitters for 2nd generation INMARSAT
[SCR-518(PSL-83-159)] N83-29490
On language families generated by commutative languages
[ISSN-0355-0087] N83-30051
Chained aggregation and control system design: A geometric approach
[AD-A125853] N83-30098
Decomposition of time scales in linear systems and Markovian decision processes
[AD-A125852] N83-30119
Comparison of linear and nonlinear random field estimators
[PB83-169755] N83-30145
Higher order asymptotics for simple linear rank statistics
[MATH-CENTRE-TRACTS-151] N83-30147

LINEARITY
Confidence envelopes for monotonic functions: Principles, derivations, and examples
[AD-A126230] N83-30151

LINGUISTICS
Natural artifical languages: Low-level processes
[AD-A125800] N83-30063

LIQUEFACTION
Formation of aromatic and possible oligomeric materials from cellulose liquefaction
[DE83-005558] N83-29432

LIQUID CHROMATOGRAPHY
A spillage detector for liquid chromatography systems
[NASA-CASE-MSC-20206-1] N83-29325

LIQUID CRYSTALS
Nonequilibrium disclinations in the carbonaceous mesophase
[AD-A125807] N83-29395
Nematic liquid crystals for display systems
[BMFT-FB-T-83-004] N83-30286
Display subsystems with liquid crystals
[BMFT-FB-T-83-047] N83-30289

LIQUID FLOW
Gas/liquid separation in transient flow preproject
[PB83-171041] N83-29352
Degassifying and mixing apparatus for liquids --- potable water for spacecraft
[NASA-CASE-MSC-18936-1] N83-29652

LIQUID FUELS
Spontaneous ignition characteristics of hydrocarbon fuel-air mixtures N83-29231
Studies of dry-powder extinguishment of diffusion flames for condensed fuels
[PB83-150656] N83-29348
Alternative fuel technology series. Volume 2: Comparative properties of conventional and alternative fuels
[ISBN-0-902937-66-9] N83-29411
Hydropyrolysis of biomass to produce liquid hydrocarbon fuels
[DE83-009985] N83-29420
Formation of aromatic and possible oligomeric materials from cellulose liquefaction
[DE83-005558] N83-29432
Oil from plants
[DE83-009141] N83-29846

LIQUID HELIUM
Technical manual for continuous flow LHe4 cryopump J.N. 2977
[AD-A125833] N83-29454

LIQUID HYDROGEN
Operating experience with a liquid-hydrogen fueled Buick and refueling system
[DE82-008113] N83-29716

LIQUID LASERS
Bibliography of Soviet laser developments, no. 55, September - October 1981
[AD-A126022] N83-29686
Bibliography of Soviet laser developments, no. 56, November - December 1981
[AD-A126023] N83-29687

LIQUID METALS
Recovery of hydrogen from hydrogen sulfide: Bench scale studies of the reaction of hydrogen sulfide with liquid copper
[DE83-005947] N83-29336

LIQUID PROPELLANT ROCKET ENGINES
AFRPL technical objective document FY 84
[AD-A125495] N83-29309

LIQUID SLOSHING
Fluid dynamic experiment in a surface tension tank: Phase 1/Phase 2A
[BMFT-FB-W-83-002] N83-29649

LIQUID-SOLID INTERFACES
Solid-liquid contacting in industrial crystalizers and its influence on product size distribution
[WTHD-150] N83-30270

LIQUID-VAPOR EQUILIBRIUM
Liquid-vapor equilibria for ternary natural gas systems
[PB83-173419] N83-29350
Thermodynamic consistency test procedure using orthogonal collocation and the Peng-Robinson equation of state
[DE83-007168] N83-30293

LIQUID-VAPOR INTERFACES
Recovery of hydrogen from hydrogen sulfide: Bench scale studies of the reaction of hydrogen sulfide with liquid copper
[DE83-005947] N83-29336

LITHIUM
Material problems in lithium, ambient-temperature, primary batteries
[DE82-010083] N83-29860
Facility for in-vivo measurement of lithium
[DE83-007388] N83-30006
LITHIUM COMPOUNDS
Gem-difluoroallyllithium: Preparation by lithium-halogen exchange and utilization in organosilicon and organic syntheses
[AD-A126094] N83-29328
LITHOSPHERE
SEASAT observations of lithospheric flexure seaward of trenches
[E83-10353] N83-29751
LIVER
State of hepatic circulation in response to combined effect of lead and electromagnetic fields N83-29982
LOAD TESTS
Portable 90 deg proof loading device
[NASA-CASE-MSC-20250-1] N83-29707
Analysis of the internal point load test
[PB83-164566] N83-29919
LOADS (FORCES)
PRESS: A computer program for evaluating explosive-material loading processes
[DE82-015256] N83-29427
Analysis of roof snow load case studies: Uniform loads
[AD-A126330] N83-29455
An evaluation of the design and analytical seismic response of a seven-story reinforced concrete frame-wall structure
[PB83-157628] N83-29470
Propagation elastic-plastic fields: Asymptotic analysis of plane strain crack growth and restrictions on moving surfaces of strong discontinuity
[DE82-018820] N83-29737
Comparison of road load simulator test results with track tests on electric vehicle propulsion system
[NASA-TM-83393] N83-29811
Analysis of the internal point load test
[PB83-164566] N83-29919
LOGIC CIRCUITS
Leadless chip carrier packaging and CAD/CAM (Computer-Aided Design/Computer-Aided Manufacturing) supported wire wrap interconnect technology for subnanosecond ECL (Emitter Coupled Logic)
[AD-A126156] N83-30277
LOGISTICS
Department of the Air Force supporting data for fiscal year 1984 budget estimates submitted to Congress, January 31, 1983. Descriptive summaries, research, development, test and evaluation
[AD-A125932] N83-30301
LONG DURATION SPACE FLIGHT
Design and development of multi-kW power electronic transformers — for long duration space applications
[NASA-CR-168082] N83-29596
LONG TERM EFFECTS
Post-flight interview with Berezevoy and Lebedev N83-29281
Elastomer toughened polyimide adhesives
[NASA-LAR-12775-2] N83-29390
Assessment of the intrinsic rain profile parameters from radar and raingauge data --- rain intensity, shape index, rainy path length N83-29554
LONGITUDINAL CONTROL
TRAGEN: Computer program to simulate an aircraft steered to follow a specified verticle profile. User's guide
[NASA-CR-166062] N83-30062
LORAN C
LORAN-C nonprecision approaches in the northeast corridor
[FAA-RD-82-78] N83-29192
LOSSES
Measurements of the complex refractive index of soils and airborne particles N83-29515
LOW GRAVITY MANUFACTURING
Method and apparatus for supercooling and solidifying substances
[NASA-CASE-MFS-25242-1] N83-29650
LOW PRESSURE
Selection and calibration of pressure transducers for low pressure measurement (0.001 psia) in the tunnel 9 high altitude side force test (WTR 1365)
[AD-A125475] N83-29657
LOW TEMPERATURE
Intrinsically irreversible heat engines
[DE82-015729] N83-29853
LUBRICANTS
The adsorption and thermal decomposition of tricresylphosphate (TCP) on iron and gold
[NASA-TM-83341] N83-29311
Electroactive polymers as antistatic materials
[AD-A126102] N83-29400
LUBRICATING OILS
Wear particle atlas, revised
[AD-A125512] N83-29402
LUBRICATION
Experimental investigations of elastohydrodynamic lubrication
[NASA-TM-81698] N83-29711
Applications of film thickness equations
[NASA-TM-81701] N83-29713
LUMINESCENCE
Rapid-screening-luminescence techniques for trace organic analysis
[DE82-017518] N83-29341
LUMINOUS INTENSITY
Standard X-ray diffraction power patterns. Section 19: Data for 51 substances
[PB83-164962] N83-30292
LYSOZYME
Action of industrial frequency electric field on indicators of natural immunity N83-29984

M

MACHINE TOOLS
DARCOM metal removal working group
[AD-A126054] N83-29451
Toward a metrology for precision-machine-tool control systems
[DE82-018077] N83-29458
MACHINING
DARCOM metal removal working group
[AD-A126054] N83-29451
MAGMA
Magma source location survey
[DE82-019816] N83-29908
MAGNESIUM CHLORIDES
Behavior of nine solar-pond candidate salts
[DE83-006029] N83-29830
MAGNET COILS
Stellarator physics evaluation studies
[DE83-006359] N83-30240
MAGNETIC ANOMALIES
Japanese MAGSAT team
[E83-10366] N83-29777
MAGNETIC DIPOLES
Electromagnetic surface fields due to a magnetic dipole buried in a three-layered Earth. Report of investigations, 1982
[PB83-148064] N83-29799
MAGNETIC DOMAINS
SEM (Scanning-Electron-Microscopy) studies of magnetic domains in amorphous metals
[AD-A126070] N83-29365
MAGNETIC FIELD CONFIGURATIONS
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172904] N83-30060
MAGNETIC FIELDS
Investigation of the effects of external current systems on the MAGSAT data utilizing grid cell modeling techniques
[E83-10358] N83-29769
Use of magnets in medical treatment N83-29986
MAGNETIC MIRRORS
Confinement and heating of high-beta plasmas with emphasis on compact toroids. Task 2: High-beta Q-machine experiment
[DE82-020341] N83-30239
Topics in plasma instabilities: Trapped-particle modes and MHD
[DE82-019194] N83-30253
MAGNETIC PROPERTIES
Local defect arrays and properties of oxides
[AD-A125927] N83-29368
MAGNETIC PUMPING
Magnetic heat pumping
[NASA-CASE-LEW-12508-3] N83-29625
MAGNETIC SURVEYS
Remote-reference magnetotelluric survey, Nevada test site and vicinity, Nevada and California
[DE82-019412] N83-29909
MAGNETIC SUSPENSION
Magnetic suspension and balance systems, a selected, annotated bibliography
[NASA-TM-84661] N83-29273
MAGNETIC VARIATIONS
Electromagnetic deep-probing (100-1000 kms) of the Earth's interior from artificial satellites: Constraints on the regional emplacement of crustal resources
[E83-10363] N83-29774
MAGNETIZATION
Magnetization of rare earth/cobalt permanent magnets subsequent to assembly in complex rotor structures
[AD-A126322] N83-30163
MAGNETOHYDRODYNAMIC GENERATORS
Modeling of imploded annular plasmas
[AD-A126179] N83-30238
Statistical magnetohydrodynamics and reversed-field-pinch quiescence
[DE82-015740] N83-30246
MAGNETOHYDRODYNAMIC STABILITY
Thresholds for the onset of fluid and magnetofluid turbulence
[DE82-017202] N83-29642
Topics in plasma instabilities: Trapped-particle modes and MHD
[DE82-019194] N83-30253
MAGNETOHYDRODYNAMIC WAVES
Japanese MAGSAT team
[E83-10366] N83-29777
MAGNETOHYDRODYNAMICS
Process parameter effects on arc physics and heat flow in GTAW
[DE82-017269] N83-29717
Coal-fired MHD combustion development project: Phase 3B
[DE82-015176] N83-29863
Geophysical plasmas and atmospheric modeling
[AD-A126341] N83-29904
Stellarator physics evaluation studies
[DE83-006359] N83-30240
Major disruptions, inverse cascades and the Strauss equations
[DE82-017188] N83-30252
MAGNETOMETERS
Superconducting niobium thin-film gradiometer technology program
[AD-A126133] N83-29656
Fiber optic magnetic sensor research
[AD-A126325] N83-30228
MAGNETOSONIC RESONANCE
Beta increase in a belt pinch plasma by fast magnetosonic wave heating
[IPF-82-11] N83-30261
MAGNETOSPHERE
Space research activities in the German Democratic Republic N83-29743
Investigation of the effects of external current systems on the MAGSAT data utilizing grid cell modeling techniques
[E83-10358] N83-29769
Currents in Saturn's magnetosphere
[NASA-TM-85055] N83-30345
Structure and dynamics of Saturn's outer magnetosphere and boundary regions
[NASA-TM-85065] N83-30346
MAGNETS
Magnetization of rare earth/cobalt permanent magnets subsequent to assembly in complex rotor structures
[AD-A126322] N83-30163
MAINTENANCE
Large airplane operations on contaminated runways
[PB83-917003] N83-29189
Elastomeric bearings design, construction and materials
[PB83-149211] N83-29723
Innovation for maintenance technology improvements
[PB83-149450] N83-29728
MAN MACHINE SYSTEMS
Evaluation of an airborne terminal for a digital data link in aviation
[DFVLR-FB-83-05] N83-29196
The 5th Advanced Aircrew Display Symposium Proceedings
[AD-A126132] N83-29206
Display-control compatibility in 3-D displays. 2: Effects of cue symmetry
[AD-A125806] N83-30036
MANAGEMENT INFORMATION SYSTEMS
Integration of new technology in Army libraries
[AD-A125983] N83-30307
Integration of new technology in Army libraries, appendices
[AD-A125984] N83-30308
The Navy Mental Health Information System (NAMHIS): An overview
[AD-A126087] N83-30309
MANAGEMENT METHODS
Towards a prescriptive organization theory of decision aiding for risk management. Phase 1: Conceptual development
[PB83-156109] N83-30304
MANAGEMENT PLANNING
The Naval Data Automation Command: A case study
[AD-A126290] N83-30300

Integration of new technology in Army libraries, appendices
[AD-A125984] N83-30308

MANEUVERABILITY
Flight test experience on military aircraft engine handling N83-29248

MANEUVERABLE SPACECRAFT
Teleoperator Maneuvering System (TMS) benefits assessment study. Volume 1: Executive summary
[NASA-CR-170795] N83-30034
Teleoperator maneuvering system benefits assessment, volume 2
[NASA-CR-170796] N83-30035

MANNED SPACE FLIGHT
USSR report: Space, No. 22
[JPRS-83612] N83-29280
Post-flight interview with Berezevoy and Lebedev N83-29281

MANNED SPACECRAFT
Evolutionary space platform concept study. Volume 2, part 2: Manned space platform concepts
[NASA-CR-170829] N83-29306

MANUAL CONTROL
Reactively steered adaptive array using microstrip patch elements at 4 gigahertz
[AD-A126298] N83-29570

MANUALS
Masonry structural design for buildings
[AD-A126314] N83-29452
Technical manual for continuous flow LHe4 cryopump J.N. 2977
[AD-A125833] N83-29454

MAPPING
Interactive analysis of digital terrain elevation and surface feature data bases
[AD-A126310] N83-29784
Cross-borehole fracture mapping using electromagnetic geotomography
[DE82-012699] N83-29910
A minimal technology routing system
[AD-A126079] N83-30122
Advanced type placement and geonames databases: Comprehensive coordination plan
[AD-A126241] N83-30299

MAPS
Mississippi Deltaic Plain Region ecological characterization: An ecological atlas. Map narratives
[PB83-157669] N83-29890
Meaning and construction of a geographic base file for a spatially oriented information system
[PB83-166108] N83-29961

MARINE TRANSPORTATION
Ferrous metal fires
[PB82-263161] N83-29387
Alternative fuel technology series. Volume 1: Alternative fuels for transport
[ISBN-0-902937-63-4] N83-29414

MARKET RESEARCH
Research in space commercialization, technology transfer and communications
[NASA-CR-172886] N83-30326

MARKETING
Transco medium-Btu coal gasification project. Executive summary
[DE82-009598] N83-29418
Research in space commercialization, technology transfer and communications
[NASA-CR-172887] N83-30327

MARKOV PROCESSES
Linear programming and finite Markovian control problems
[MATH-CENTRE-TRACTS-148] N83-30050
Decomposition of time scales in linear systems and Markovian decision processes
[AD-A125852] N83-30119

MARS ATMOSPHERE
Infrared radiation and inversion population of CO2 laser levels in Venusian and Martian atmospheres
[NASA-TM-85057] N83-30341

MARSHLANDS
Literature review of organic matter transport from marshes
[E83-10352] N83-29750

MARTENSITE
The effects of grain size on the martensitic transformation in copper-zinc-aluminum shape memory alloys
[AD-A126056] N83-29363

MARTENSITIC TRANSFORMATION
The effects of grain size on the martensitic transformation in copper-zinc-aluminum shape memory alloys
[AD-A126056] N83-29363

MASERS
Theory of gyrotron amplifier in a tape helix loaded waveguide
[AD-A126114] N83-29603

MASKING
Spatial and temporal visual masking and visibility
[AD-A125696] N83-30000
Method for growing low defect, high purity crystalline layers --- photovoltaic cells
[NASA-CASE-NPO-15813-1] N83-30269

MASONRY
Masonry structural design for buildings
[AD-A126314] N83-29452

MASS DISTRIBUTION
Neutrino oscillations: Present and future experiments
[DE82-903207] N83-30186

MASS FLOW
Venturi design for metering solids flow in gas-solids suspensions
[DE83-004314] N83-29660
Development of the cone calorimeter, a bench scale heat release rate apparatus based on oxygen consumption
[PB83-151266] N83-29673

MASS SPECTROSCOPY
Accelerator mass spectrometry: From nuclear physics to dating
[DE83-007863] N83-29342

MASS TRANSFER
Recovery of hydrogen from hydrogen sulfide: Bench scale studies of the reaction of hydrogen sulfide with liquid copper
[DE83-005947] N83-29336
Characterization of tar products from rapid pyrolysis of bituminous coals
[DE83-007272] N83-29346
Analysis of the adsorption process and of desiccant cooling systems: A pseudo- steady-state model for coupled heat and mass transfer
[DE83-005752] N83-29828

MATCHED FILTERS
Generalized matched filters
[AD-A126319] N83-29606

MATCHING
Matching edges in maps and aerial images using the chamfer matching algorithm
[FOA-C-30315-E1] N83-29791
Color Vision Conference
[AD-A125435] N83-30001

MATERIALS HANDLING
Ferrous metal fires
[PB82-263161] N83-29387
Propellant handler's ensemble in-suit noise measurements
[AD-A125507] N83-30040

MATERIALS RECOVERY
Metal coordination chemistry: Removal and recovery of metal compounds from heavy crude and shale oils with multidentate ligands
[DE83-006912] N83-29343
Recovery of precious metals from cyanide solutions, plating baths and liquid residues from homogeneous catalysis processes
[BMFT-FB-T-83-030] N83-29347
In-plant recycling of stainless and other specialty steelmaking wastes. Report on investigations, 1982
[PB83-157701] N83-29382
Recovery of sulfur and accessory metals from a leaching process residue
[PB83-157651] N83-29383

MATHEMATICAL MODELS
Coupling of transport and chemical processes in catalytic combustion N83-29230
Unsteady flow effects in combustor systems N83-29232
Numerical modeling of turbulent combustion N83-29233
Models for predicting tip clearance changes in gas turbines N83-29255
Gas/liquid separation in transient flow preproject
[PB83-171041] N83-29352
Model of the steady-state performance of an absorption heat pump
[PB83-152314] N83-29471
Uncertainties in estimating worst month statistics for Earth-space links influenced by rain N83-29523
Numerical calculations of space-harmonic and full-wave scattering models N83-29534
On electromagnetic methods in geophysical probing N83-29547
Response of a layer to sinusoidal or impulsive electromagnetic excitation: Approximation of the thin plate --- Earth resource exploration N83-29548
Pressure sintering and creep deformation: A joint modeling approach --- ceramics
[DE83-006516] N83-29738
Literature review of organic matter transport from marshes
[E83-10352] N83-29750
SEASAT observations of lithospheric flexure seaward of trenches
[E83-10253] N83-29751
Investigation of the effects of external current systems on the MAGSAT data utilizing grid cell modeling techniques
[E83-10358] N83-29769
On language families generated by commutative languages
[ISSN-0355-0087] N83-30051
Case-studies in direct digital control of stochastic systems
[OUEL-1430/82] N83-30102
A critique and an appraisal of VLSI models of computation
[AD-A125835] N83-30117
Time scales, coherency, and weak coupling
[AD-A125845] N83-30118
Invariant multiplicative efficiency and piecewise Cobb-Douglas envelopments
[AD-A126239] N83-30157
Turbulence spectra in the noise source regions of the flow around complex surfaces
[NASA-TM-83392] N83-30168
Numerical studies of the intrinsic charm model
[PB83-164798] N83-30208
Introduction to the possible substructure of quarks and leptons
[PB83-165605] N83-30211
Survey of models of baryon production in e plus e minus annihilation
[PB83-166850] N83-30212
Methods for two-dimensional charged-particle transport in collisionless plasmas
[DE82-014044] N83-30245
Statistical magnetohydrodynamics and reversed-field-pinch quiescence
[DE82-015740] N83-30246
Density and potential measurements in an intense ion-beam-generated plasma
[DE82-018803] N83-30248
Theoretical modeling of EMP effects in semiconductor junction devices
[AD-A125976] N83-30273

MATHEMATICAL TABLES
Tables of spherical Bessel functions of the first and second kinds for complex arguments
[AD-A125876] N83-30130

MATRICES (CIRCUITS)
Spacecraft IF switch matrix for wideband service applications in 30/20 GHz communications satellite systems: Proof-of-concept model, executive summary
[NASA-CR-168175] N83-29492

MATRICES (MATHEMATICS)
CAD of control systems: Application of nonlinear programming to a linear quadratic formulation
[NASA-CR-172151] N83-29448
An evaluation of the design and analytical seismic response of a seven-story reinforced concrete frame-wall structure
[PB83-157628] N83-29470
Scattering and absorption by atmospheric aerosol models N83-29542
On language families generated by commutative languages
[ISSN-0355-0087] N83-30051
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172906] N83-30054
An analysis of sparse matrix storage schemes
[MATH-CENTRE-TRACTS-150] N83-30103
High-performance banded and profile equation solvers for the CRAY-1. Part 1: The unsymmetric case
[AD-A125561] N83-30115
High-performance banded equation solver for the CRAY-1. Part 2: The symmetric case
[AD-A125560] N83-30127

MATTER (PHYSICS)
Devil's staircase and order without periodicity in classical condensed matter
[DE82-015744] N83-30283
Higgs mass scales and matter-anti-matter oscillations in grand unified theories
[DE82-017638] N83-30294

MAXIMUM LIKELIHOOD ESTIMATES
Angle of arrival estimation
[AD-A126038] N83-29571
Physical considerations in the analysis and synthesis of hydrologic sequences
[PB83-167593] N83-29938

MAXWELL EQUATION
Propagation properties of surface-wave modes in a quasi-multimode, uniaxially anisotropic, graded-index optical waveguide with circularly cylindrical symmetry
[PB83-165167] N83-30235
MEAN
The effect of environmental change in single-subject experiments
[AD-A125779] N83-30150
MEAN SQUARE VALUES
Topics in robust statistical signal processing
[AD-A125931] N83-30126
MEASURING INSTRUMENTS
Report of the 67th National Conference on Weights and Measures 1982
[PB83-167148] N83-29473
Flow resistivity instrument
[NASA-CASE-LAR-13053-1] N83-29783
Non-invasive method and apparatus for measuring pressure within a pliable vessel
[NASA-CASE-ARC-11264-2] N83-29991
MECHANICAL DRIVES
Integrated optical transmitter and receiver
[AD-A125493] N83-29575
MECHANICAL ENGINEERING
Innovation for maintenance technology improvements
[PB83-149450] N83-29728
MECHANICAL PROPERTIES
Investigation of crew restraint system biomechanics
[AD-A126199] N83-29190
Microstructure and fatigue behavior of 3 nickel base eutectic composites
[AD-A125571] N83-29369
Mechanical reliability of current alumina and beryllia ceramics used in microwave windows for gyrotrons
[DE83-006360] N83-29404
Elastomeric bearings design, construction and materials
[PB83-149211] N83-29723
Mechanical behavior of shear wall vertical boundary members: An experimental investigation
[PB83-159764] N83-29742
Sensing systems for measuring mechanical properties in ground masses. Volume 2: In situ testing with the Menard pressuremeter
[PB83-155952] N83-29792
Sensing systems for measuring mechanical properties in ground masses. Volume 4: Static penetrometer
[PB83-155978] N83-29794
Mechanical, thermal, and fluid transport properties of rock at depth
[DE82-016008] N83-29912
Mechanical properties of the spinal ligaments of primates. Part 1: Cyclic loading. Part 2: Mathematical modeling
[AD-A125540] N83-29968
MECHANICAL SHOCK
Testing to quantify the effects of handling of gas dielectric standard capacitors
[PB83-149385] N83-29624
MEDICAL SCIENCE
Notes for medical catalogers, 1982
[PB83-170860] N83-30317
MEDLARS and health information policy
[PB83-168658] N83-30318
MEDICAL SERVICES
Treatment of hypothermia in a seaman following the shipwreck of a coastal motorship
[DRIC-T-6835] N83-29998
Emergency Medical Service (EMS): Rotorcraft Technology Workshop
[NASA-CR-166495] N83-30325
MELTING
Induction heating gun
[NASA-CASE-LAR-13181-1] N83-29591
MELTING POINTS
Kinetics of the thermal decomposition of solid PETN
[DE82-004368] N83-29425
Formation of aromatic and possible oligomeric materials from cellulose liquefaction
[DE83-005558] N83-29432
Backscattering and differential backscattering characteristics of the melting layer --- of the atmosphere N83-29543
MEMBRANE STRUCTURES
Membrane separations in chemical processing
[PB83-165068] N83-29355
MEMBRANES
Countercurrent reverse osmosis for ethanol-water separation
[DE83-009725] N83-29333
Low-energy process to extract anhydrous ethanol from fermentation beers
[DE83-005012] N83-29419
MENTAL HEALTH
The Navy Mental Health Information System (NAMHIS): An overview
[AD-A126087] N83-30309
MENTAL PERFORMANCE
Components of individual differences in human intelligence
[AD-A125633] N83-30012
Display-control compatibility in 3-D displays. 2: Effects of cue symmetry
[AD-A125806] N83-30036
Modeling and analysis of teams of interacting decisionmakers with bounded rationality
[AD-A125582] N83-30298
MERCURY (METAL)
A microscopic model for the liquid metal: Ionic solution interface
[AD-A125531] N83-29367
MERCURY CADMIUM TELLURIDES
Advanced methods for preparation and characterization of infrared detector materials
[NASA-CR-170798] N83-30271
MERIDIONAL FLOW
Vertical sections of temperature, salinity, thermosteric anomaly, and zonal geostrophic velocity from Norpax shuttle experiment, part 3
[PB83-169961] N83-29960
MESONS
Quark-antiquark bound-state spectroscopy and QCD
[DE83-007062] N83-30204
MESOSCALE PHENOMENA
Improved simulations of mesoscale meteorology
[AD-A125815] N83-29928
The operational meteorology of convective weather. Volume 1: Operational mesoanalysis
[PB83-162321] N83-29941
MESOSPHERE
Mesospheric water vapor measured with an airborne sensor N83-29531
Automatic recognition of mesocyclones from single Doppler radar data
[AD-A125854] N83-29929
Modelling of the 10-micrometer natural laser emission from the mesospheres of Mars and Venus
[NASA-TM-85045] N83-30342
MESSAGE PROCESSING
SATNET development and operation, Pluribus Satellite IMP development, Internet operations and maintenance, Mobile Access Terminal Network
[AD-A125959] N83-29563
Continued development of the Universal Network Interface Device
[AD-A126031] N83-29569
METABOLISM
Monitoring biotransformation and biodegradation of xenobiotics in simulated aquatic microenvironmental systems
[PB83-153718] N83-29883
Biochemical and physiological characterization of higher plants with reduced photorespiration
[DE83-007949] N83-29972
Effect of industrial frequency electric field (50 Hz) on metabolism of copper, iron and metalloenzymes bound to them (experimental research) N83-29985
METAL AIR BATTERIES
Metal-air battery research and development
[DE82-019881] N83-29864
METAL FATIGUE
A survey of serious aircraft accidents involving fatigue fracture. Volume 1: Fixed-wing aircraft
[NAE-AN-7] N83-29187
A survey of serious aircraft accidents involving fatigue fracture. Volume 2: Rotary-wing aircraft
[NAE-AN-8] N83-29188
Changes in residual stress, domain size and microstrain during fatigue of 1008 steel
[AD-A126058] N83-29364
Statistical summaries of fatigue data for design purposes
[NASA-CR-3697] N83-29731
METAL IONS
Spectroscopic investigations of materials for tunable infrared lasers
[AD-A125538] N83-29689
METAL OXIDE SEMICONDUCTORS
The development of refractory metallization for high-speed VISI circuits
[AD-A125783] N83-29598
Large-scale circuit simulation
[AD-A125941] N83-29607
MOS-transistors for power applications
[BMFT-FB-T-83-059] N83-29623
GaAs Schottky barrier photo-responsive device and method of fabrication --- photovoltaic cells
[NASA-CASE-GSC-12816-1] N83-30268
Spectroscopic studies of the electronic structure of metal-semiconductor and vacuum-semiconductor interfaces
[AD-A125621] N83-30272
METAL OXIDES
Method of forming oxide coatings --- for solar collector heating panels
[NASA-CASE-LEW-13132-1] N83-29388
METAL POWDER
A fundamental study of tool steels processed from rapidly solidified powders
[AD-A126163] N83-29362
METAL WORKING
Titanium: Past, present, and future
[PB83-171132] N83-29386
METAL-METAL BONDING
Process parameter effects on arc physics and heat flow in GTAW
[DE82-017269] N83-29717
METALLIZING
The development of refractory metallization for high-speed VISI circuits
[AD-A125783] N83-29598
METALS
Oxygen and titanium sputtering yields as determined by laser fluorescence and Auger electron spectroscopy for monolayer oxygen coverage of polycrystalline Ti
[DE83-007683] N83-29373
Grain-boudary-diffusion mechanisms in metals
[DE82-018814] N83-30280
METEOROLOGICAL PARAMETERS
The PACEM experiment on line of sight multipath propagation --- propagation in clear air and meteorology (PACEM) N83-29499
Propagation anomalies in a 4.7 and 11 GHz line of sight path N83-29504
Space research activities in the German Democratic Republic N83-29743
Improved simulations of mesoscale meteorology
[AD-A125815] N83-29928
Terminal forecast reference notebook for RAF Fairford, United Kingdom
[AD-A126095] N83-29930
Terminal forecast reference notebook for Katterbach AAF, Germany
[AD-A126097] N83-29932
National severe local storms operations plan
[PB83-163998] N83-29940
METEOROLOGICAL RADAR
Backscattering and differential backscattering characteristics of the melting layer --- of the atmosphere N83-29543
Capability of surface-based clear-air Doppler radar for monitoring meteorological properties in elevated layers N83-29549
Radar modeling of space diversity associated with slant path rain attenuation at variable path angles, frequencies, and drop size distributions N83-29551
Assessment of the intrinsic rain profile parameters from radar and raingauge data --- rain intensity, shape index, rainy path length N83-29554
Automatic recognition of mesocyclones from single Doppler radar data
[AD-A125854] N83-29929
METEOROLOGICAL SATELLITES
Satellite moisture retrieval techniques. Volume 1: Technique development and evaluation
[AD-A126245] N83-29933
Proceedings of the WEFAX Users' Conference for National and International Users of GOES WEFAX Services
[PB83-161117] N83-29947
METEOROLOGICAL SERVICES
Proceedings of the WEFAX Users' Conference for National and International Users of GOES WEFAX Services
[PB83-161117] N83-29947
METHANE
Marine Biomass Program: Kelp biomass program summary
[PB83-167247] N83-29438
Emission characterization of a spark-ignited, heavy-duty, direct-injected methanol engine
[PB83-156372] N83-29722
METHYL ALCOHOLS
Evaluation of fuel additives for reduction of material imcompatibilities in methanol-gasoline blends
[NASA-CR-168061] N83-29359
Methanol as an alternate transportation fuel
[GPO-12-626] N83-29412
Development of alcohol-based synthetic transportation fuels from coal-derived synthesis gases
[DE83-004857] N83-29434
Methanol from landfill gas: Technology and economics
[PB83-169144] N83-29443

METHYLHYDRAZINE
Environmental fate of hydrazine fuels in aqueous and soil environments
[AD-A125813] N83-29870

METROLOGY
Toward a metrology for precision-machine-tool control systems
[DE82-018077] N83-29458

MICHIGAN
Use of remote sensing for land use policy formulation
[E83-10326] N83-29747

MICROBIOLOGY
Monitoring biotransformation and biodegradation of xenobiotics in simulated aquatic microenvironmental systems
[PB83-153718] N83-29883

MICROCOMPUTERS
Design of a high-speed digital processing element for parallel simulation
[NASA-TM-83373] N83-29597
Microcomputers in transportation. Volume 1: Selected readings
[PB83-169904] N83-30048
Non-parametric statistical software for the TRS-80 microcomputer
[AD-A126055] N83-30073
Local code generation and compaction in optimizing microcode compilers
[AD-A126026] N83-30076

MICROELECTRONICS
Biotechnology: The forging of multidisciplinary strategies for research in biomolecular electronics, materials sciences and microecology
[AD-A125799] N83-29967
European Scientific Notes, Volume 36, Number 12
[AD-A126057] N83-30353

MICROORGANISMS
Development of a process to produce alcohol at paper mills
[DE83-009668] N83-29422
Production of butanol by fermentation in the presence of co-culture of clostridium
[NASA-CASE-NPO-16203-1] N83-29806
Microbial degradation of oil: Research and development 1982, TOBOS 85 program — techniques for oil combat and clean-up (TOBOS 85)
[FOA-C-40167-B4] N83-29881

MICROPHONES
Carbon granule probe microphone for leak detection
[NASA-CASE-NPO-16027-1] N83-29595

MICROPROCESSORS
FDAS EPROM programming manual
[DE82-019229] N83-30085
A review of currently available high performance interactive graphic systems
[PB83-165951] N83-30091
Distributed information delivery system. Design manual, version 1.0
[PB83-148809] N83-30321
Distributed information delivery system module descriptions, version 1.0
[PB83-156703] N83-30322

MICROSCOPY
A microscopic model for the liquid metal: Ionic solution interface
[AD-A125531] N83-29367

MICROSTRUCTURE
Effect of microstructure and internal hydrogen on fatigue crack propagation of ultrahigh strength steels N83-29357
The effects of grain size on the martensitic transformation in copper-zinc-aluminum shape memory alloys
[AD-A126056] N83-29363
Changes in residual stress, domain size and microstrain during fatigue of 1008 steel
[AD-A126058] N83-29364
Radiation-induced microstructural changes in Ni-C and Pt-C alloys
[DE83-007815] N83-29371
Structure and properties of nickel-boron-layers
[BMFT-FB-T-82-241] N83-29374
Pressure sintering and creep deformation: A joint modeling approach — ceramics
[DE83-006516] N83-29738

MICROWAVE AMPLIFIERS
Mechanical reliability of current alumina and beryllia ceramics used in microwave windows for gyrotrons
[DE83-006360] N83-29404

MICROWAVE ATTENUATION
Statistics on the fine scale structure of rain in Stockholm, 1977-1979 N83-29521

MICROWAVE EMISSION
Dependence of biological effects of microwave irradiation on exposure intensity and duration N83-29980
High-power generation of microwave and infrared radiation
[AD-A125953] N83-30161

MICROWAVE RADIOMETERS
First global results of the European Space Agency OTS propagation campaign N83-29511
Correlation between various radioelectrical data at 11.4, 11.6, and 35 GHz — OTS and radiometer data N83-29513
Effects of the atmosphere on image resolution in microwave radiometry N83-29530
Comparison of two methods for estimating the water vapor correction to altimeter readings from radiometric measurements N83-29541
Definition of standards and methods of calibrating for Imaging Microwave Radiometers (IMR)
[ESA-CR(P)-1724] N83-29671

MICROWAVE SCATTERING
Generalized approach to radio wave scatter from time-varying rough surfaces N83-29537

MICROWAVE SPECTROMETERS
Helicopter-borne scatterometer
[AD-A125796] N83-29561

MICROWAVE SWITCHING
Spacecraft IF switch matrix for wideband service applications in 30/20 GHz communications satellite systems: Proof-of-concept model, executive summary
[NASA-CR-168175] N83-29492

MICROWAVE TRANSMISSION
Analysis of multipath fading observations on certain microwave paths in British Columbia N83-29498
Microwave multipath from sea reflections: The Bay of Fundy N83-29500
Measurements of radio refractive index profiles in tropical and equatorial regions and their influence on line of sight microwave links N83-29503
Propagation anomalies in a 4.7 and 11 GHz line of sight path N83-29504
Amplitude scintillation in propagation paths above 10 GHz N83-29508
Effects of dust/sandstorm on some aspects of microwave propagation N83-29516
Cross polarisation on terrestrial microwave links during clear weather N83-29527
The dependency on the propagation environment of the frequency scaling of attenuation N83-29550

MICROWAVE TUBES
Theory of cusptron microwave tubes
[AD-A126116] N83-29605

MICROWAVES
Propagation effects handbook for satellite systems design. A summary of propagation impairments on 10 to 100 GHz satellite links with techniques for system design
[NASA-RP-1082(03)] N83-29491
Microwave conditioned dc discharges for excitation of rare-gas-halide lasers
[AD-A126222] N83-29694
Effect of cordiamine and mesatone on ECG under conditions of acute microwave irradiation N83-29977
Genetic danger of non-thermal intensity microradio waves and its hygienic aspects N83-29987
Microwaves and human leukocyte function
[AD-A124000] N83-29998
Infrared detection of microwave induced surface currents on flat plates
[AD-A126207] N83-30227

MIE SCATTERING
Multiple scattering effects in aerosols: Theoretical investigations
[AD-A125480] N83-29693
Single and multiple scattered solar radiation
[AD-A126323] N83-30349

MILITARY AIR FACILITIES
Terminal forecast reference notebook for Katterbach AAF, Germany
[AD-A126097] N83-29932

MILITARY HELICOPTERS
Airworthiness and Flight Characteristics test (A&FC) of AH-1S with Aircraft General Purpose Dispenser System (AGPDS)
[AD-A125978] N83-29199

MILITARY OPERATIONS
Operational engine usage N83-29246
Scientific communication and national security
[PB83-157800] N83-30320

MILITARY TECHNOLOGY
Department of Defense in-house RDT and E (Research Development Test and Evaluation) activities
[AD-A125498] N83-30302

MILITARY VEHICLES
Navigation: National plans; NAVSTAR-GPS; Laser gyros
[AD-A125533] N83-29194

MILLIMETER WAVES
Statistics of radio refractivity and atmospheric attenuation in tropical climates — Africa N83-29505
Experimental study of propagation characteristics in millimeter wave region N83-29517
One-hundred GHz open-resonator measurements of artificial precipitation and fog propagation parameters N83-29522
Cross polarisation on terrestrial microwave links during clear weather N83-29527
Exploration of new methods to produce efficient sources of coherent near millimeter wave radiation
[AD-A125772] N83-29559
The generation of near millimeter radiation by picosecond pulse demodulation
[AD-A125510] N83-29576

MINERAL DEPOSITS
Recovery of tungsten from a hydrothermally altered deposit. Report of investigations, 1982
[PB83-157719] N83-29381
Platinum availability - market economy countries: A minerals availability system appraisal
[PB83-156869] N83-29385
Titanium: Past, present, and future
[PB83-171132] N83-29386
Utilization of LANDSAT multispectral data in geobotanical investigations: The location of ironstone gravel in the Sam Houston National Forest
[E83-10361] N83-29772
Hydrogeochemical and stream sediment reconnaissance basic data for Bangor and Bath quadrangles, Maine
[DE83-005630] N83-29786
Demonstrated reserve base of coal in the United States on 1 January 1980
[DE83-006471] N83-29789

MINERAL EXPLORATION
Hydrogeochemical and stream sediment reconnaissance basic data for Bangor and Bath quadrangles, Maine
[DE83-005630] N83-29788

MINERALS
Acidity, nutrients and minerals in atmospheric precipitation over Florida: Deposition patterns, mechanisms and ecological effects
[PB83-165837] N83-29888
Mineral separation in a CELSS by ion-exchange chromatography N83-30033

MINICOMPUTERS
Vibration in planetary gear systems with unequal planet stiffnesses
[NASA-TM-83428] N83-29709
Remote sensing of surface propagation parameters: Application of imagery simulation model results
[AD-A125513] N83-29785

MINIMA
Moments of the minimum of a random walk and complete convergence
[AD-A125768] N83-30148

MINNESOTA
Ground water quality in southeastern Minnesota
[PB83-154377] N83-29800

MIRROR FUSION
Synfuel from fusion: Using the tandem mirror reactor and a thermochemical cycle to produce hydrogen
[DE83-005216] N83-29424
Fusion Energy Workshop
[PUBL-97-128] N83-30236

MIRRORS
Antenna digital control for the Directed Mirror Antenna Radar (DMAR)
[AD-A125812] N83-29585
Manufacturing and cost analyses of heliostats based on the second-generation heliostat-development study
[DE83-006664] N83-29835
X-ray imaging mirror system and method of producing the same
[NASA-CASE-NPO-15828-1] N83-30222

MISSILE SYSTEMS
Survey of missile simulation and flight mechanics facilities in NATO
[AGARD-AG-279] N83-29276
Tactical missile technologies: The European perspective
[AD-A126277] N83-29295

MISSILE VIBRATION
Vibration and aeroelastic facility
[AD-A126317] N83-29275

MISSILES
AFRPL technical objective document FY 84 ...
[AD-A125495] N83-29309
Graphite ablation in several gas environments
[AD-A125511] N83-29319

MISSISSIPPI DELTA (LA)
Mississippi Deltaic Plain Region ecological characterization: An ecological atlas. Map narratives
[PB83-157669] N83-29890

MISSISSIPPI RIVER (US)
Increased automobile fuel efficiency and synthetic fuels. Alternatives for reducing oil imports. Background paper 5: Water availability for synthetic fuels: An assessment of current studies
[PB83-152645] N83-29437

MISSOURI
Agricultural land cover mapping in the context of a geographically referenced digital information system --- Carroll, Macon, and Gentry Counties, Missouri
[E83-10357] N83-29768

MISSOURI RIVER (US)
Increased automobile fuel efficiency and synthetic fuels. Alternatives for reducing oil imports. Background paper 5: Water availability for synthetic fuels: An assessment of current studies
[PB83-152645] N83-29437

MITOCHONDRIA
USSR report: Life sciences. Effects of nonionizing electromagnetic radiation, no. 10
[JPRS-83745] N83-29973
Effect of low-intensity superhigh-frequency energy on respiration and oxidative phosphorylation of organ mitochondria and activity of some blood enzymes N83-29975

MIXING
Dispersion in fracture networks
[DE83-005584] N83-29913

MIXTURES
Lean limit phenomena N83-29229

MOBILITY
Chemical modification of carbon electrodes
[AD-A125964] N83-29327

MODELS
Competitive argumentation in computational theories of cognition
[AD-A125577] N83-30009

MODULUS OF ELASTICITY
Elastohydrodynamics of elliptical contacts for materials of low elastic modulus
[NASA-TM-81699] N83-29712

MOISTURE
Satellite moisture retrieval techniques. Volume 1: Technique development and evaluation
[AD-A126245] N83-29933

MOISTURE CONTENT
Process for producing oxygen
[DE83-006648] N83-29344
Commercial scale coal test. Volume 1: Selection of camp 1 coal
[DE83-007436] N83-29435
Thermal behavior of fine-grained soils. Building science series
[PB83-164400] N83-29472

MOLDING MATERIALS
Gas turbine parts made of injection molded silicon nitride and brazing of silicon nitride with metal
[BMFT-FB-T-83-028] N83-29377
Plastics in the 80's
[PB83-163311] N83-29409

MOLECULAR BEAMS
High-resolution laser and rf spectroscopy of atomic and molecular beams
[DE83-008942] N83-29699
Molecular beam chemistry: Reactions of oxygen atoms with halogen molecules
[AD-A125870] N83-30175
Molecular beam studies of low energy reactions
[AD-A126091] N83-30177

MOLECULAR BIOLOGY
Molecular biology of environmental aromatic hydrocarbons
[DE82-016978] N83-29875
Biotechnology: The forging of multidisciplinary strategies for research in biomolecular electronics, materials sciences and microecology
[AD-A125799] N83-29967

MOLECULAR COLLISIONS
Collisional energy transfer in highly vibrationally excited molecules
[AD-A126047] N83-30180
Formation of quark-gluon plasma in nuclear collisions
[DE82-018521] N83-30184
Neutral-particle-beam production and injection
[DE83-006966] N83-30201
Polarized E + - polarized p colliding beams: Physics issues
[DE83-006645] N83-30295

MOLECULAR ELECTRONICS
Biotechnology: The forging of multidisciplinary strategies for research in biomolecular electronics, materials sciences and microecology
[AD-A125799] N83-29967

MOLECULAR ENERGY LEVELS
Multiphoton ionization and third-harmonic generation in atoms and molecules
[DE82-015748] N83-30185

MOLECULAR FLOW
Semiconductor measurement technology: Graphical solution for the helium leak detector and radioisotope methods of hermetic test, master graphs and instructions
[PB83-146845] N83-29672

MOLECULAR IONS
High-resolution laser and rf spectroscopy of atomic and molecular beams
[DE83-008942] N83-29699
Molecular beam studies of low energy reactions
[AD-A126091] N83-30177

MOLECULAR OSCILLATIONS
Neutrino oscillations: Present and future experiments
[DE82-903207] N83-30186

MOLECULAR RELAXATION
Collisional energy transfer in highly vibrationally excited molecules
[AD-A126047] N83-30180

MOLECULAR ROTATION
Collisional energy transfer in highly vibrationally excited molecules
[AD-A126047] N83-30180

MOLECULAR SPECTRA
Infrared molecular emissions from comets
[NASA-TM-85067] N83-30344

MOLECULAR SPECTROSCOPY
New-particle spectroscopy, quarkonium and gluonic mesons
[DE83-007012] N83-30203

MOLECULAR STRUCTURE
A microscopic model for the liquid metal: Ionic solution interface
[AD-A125531] N83-29367
Circular differential scattering is an important part of the circular dichroism of macromolecules
[DE83-007022] N83-29405
Theory of reactions at a solid surface
[AD-A126202] N83-29697
Structures and polarized electronic absorption spectra of dimolybdenum tetraformate crystals
[DE83-004863] N83-30281
Devil's staircase and order without periodicity in classical condensed matter
[DE82-015744] N83-30283

MOLECULAR WEIGHT
Identification and comparative genotoxicity of polycyclic aromatic hydrocarbons and related nitrogen-containing heteroatomic species in products from coal liquefaction processes
[DE83-006939] N83-29312
Non-steady gas dynamic effects in the induction domain behind a strong shock wave
[CA-8229] N83-29633
Direct enzymatic extraction of starch from corn as an energy-saving alternative to production of high-fructose syrup
[DE82-008314] N83-29822

MOLECULES
Restrained least-squares program (RESLSQ) users manual
[AD-A126171] N83-30082

MOLYBDENUM COMPOUNDS
Structures and polarized electronic absorption spectra of dimolybdenum tetraformate crystals
[DE83-004863] N83-30281
Thermionic-emission microscopy of polycrystalline molybdenum and Mo-LaCrO-3
[DE83-006596] N83-30284

MOMENTS
Moments of the minimum of a random walk and complete convergence
[AD-A125768] N83-30148

MONITORS
Operational engine usage N83-29246

MONOCHROMATIC RADIATION
Influence of prolonged illumination of the rabbit retina by monochromatic light on its functional state N83-29979

MONTE CARLO METHOD
Monte Carlo modeling in elliptic flows N83-29225
The application of Monte Carlo codes to neutron dosimetry
[DE82-017635] N83-30154
A review of quantum Monte Carlo methods and results for Coulombic systems
[DE83-006570] N83-30155

MOORING
The long term upper ocean study (LOTUS) cruise summary and hydrographic data report OCEANUS 119, May 1982
[AD-A125737] N83-29956

MORPHOLOGY
USSR report: Life sciences. Effects of nonionizing electromagnetic radiation, no. 10
[JPRS-83745] N83-29973
Morphological changes in neurons of the central nervous system in response to experimental influence of centimeter-range electromagnetic waves on the body N83-29983

MOSSBAUER EFFECT
CO + H sub 2 reactions over nitrogen-modified iron catalysts
[DE83-006579] N83-29335

MOTION SICKNESS
Research opportunities in space motion sickness, phase 2
[NASA-CR-3708] N83-29993

MOTION SICKNESS DRUGS
Effects of some motion sickness suppressants on tracking performance during angular accelerations
[AD-A123839] N83-29994

MOTIVATION
The measurement of motivational style: A format modification
[AD-A125756] N83-30014

MOTOR VEHICLES
Emissions and fuel economy of the Kat's engine block heater device
[PB83-165548] N83-29724

MOUNTAINS
Roede formation: Early old red sandstone facies in the Silurian of Jaemtland Sweden
[PB83-165621] N83-29917
Procedures for the measurement of acute mountain sickness
[AD-A126280] N83-29995

MULTIPATH TRANSMISSION
Analysis of multipath fading observations on certain microwave paths in British Columbia N83-29498
The PACEM experiment on line of sight multipath propagation --- propagation in clear air and meteorology (PACEM) N83-29499
Microwave multipath from sea reflections: The Bay of Fundy N83-29500
Rates of change of propagation medium transfer functions during selective fadings N83-29501
Distortions in FM car radios caused by multipath reception and their reduction by means of antenna diversity N83-29502
Propagation anomalies in a 4.7 and 11 GHz line of sight path N83-29504
On the use of communication concepts and techniques for remote sensing N83-29545
A fading simulator for frequency selective fading and measurements with a 34 Mbit/s QPSK modem
[FTZ-445-TBR-22] N83-29589

MULTIPHOTON ABSORPTION
Resonantly enhanced vacuum-ultraviolet generation and multiphoton ionization in carbon monoxide gas
[DE82-012147] N83-30183

MULTIPLE ACCESS
Multiaccess of a slotted channel using a control mini-slot
[AD-A125569UVA-525634/EE82/106] N83-29562
Electronic equipment in multiple access information systems
[AD-A126169] N83-29612
Resource sharing in a network of personal computers
[AD-A126003] N83-30096

MULTIPLE BEAM INTERVAL SCANNERS
On the aperture illumination of multibeam satellite antennas
[FTZ-454-TBR-36] N83-29588

MULTIPLEXING
Display subsystems with liquid crystals
[BMFT-FB-T-83-047] N83-30289

MULTISPECTRAL BAND SCANNERS
Analytical design of multispectral sensors
[E83-10337] N83-29748
Evaluation of LANDSAT-4 TM and MSS ground geometry performance without ground control
[E83-10338] N83-29749
TM report N83-29757
Investigation of radiometric properties of LANDSAT-4 MSS N83-29758
Impact of LANDSAT MSS sensor differences on change detection analysis N83-29759
Spectral characterization of the LANDSAT-4 thematic mapper sensors N83-29760
Evaluation of the radiometric quality of the TM data using clustering and multispectral distance measures N83-29762

MULTISTATIC RADAR
Multistatic sonar with omnidirectional receivers
[REPT-10-82] N83-29486
MULTIVARIATE STATISTICAL ANALYSIS
Representation of multivariate functions
[AD-A125898] N83-30132
Confidence envelopes for monotonic functions: Principles, derivations, and examples
[AD-A126230] N83-30151
MUTAGENS
Identification and comparative genotoxicity of polycyclic aromatic hydrocarbons and related nitrogen-containing heteroatomic species in products from coal liquefaction processes
[DE83-006939] N83-29312
Autoallergic effects of microwave electromagnetic energy and their influence on the fetus and offspring N83-29974
MX MISSILE
MX systems study
[AD-A126083] N83-29296

N

NASA PROGRAMS
Scientific and technical information output of the Langley Research Center for calendar year 1982
[NASA-TM-84615] N83-30306
National Aeronautics and Space Administration Authorization Act, 1983 N83-30324
Pioneer Venus
[NASA-SP-461] N83-30340
NATIONAL PARKS
Computer implemented land cover classification using LANDSAT MSS digital data: A cooperative research project between the National Park Service and NASA. 3: Vegetation and other land cover analysis of Shenandoah National Park
[E83-10362] N83-29773
NATURAL GAS
Liquid-vapor equilibria for ternary natural gas systems
[PB83-173419] N83-29350
Superacids as catalysts for selected hydrocarbon convers
[PB83-166546] N83-29353
Transco medium-Btu coal gasification project. Executive summary
[DE82-009598] N83-29418
Development of improved capabilities for computation of gas supercompressibility factors and other properties
[PB83-173369] N83-29444
Pulse combustion residential water heater
[PB83-167221] N83-29480
Conceptual design of a direct-contact natural-gas-fired downhole steam generator
[DE82-019875] N83-29851
NATURAL LANGUAGE (COMPUTERS)
Generating natural language explanations in a computer-aided design system
[AD-A126190] N83-30079
NAUTICAL CHARTS
US Coast Pilot 1. Atlantic Coast: Eastport to Cape Cod (19th Edition)
[PB83-157537] N83-29959
NAVIER-STOKES EQUATION
Applications of the contravariant form of the Navier-Stokes equations
[NASA-TM-83448] N83-29179
Parabolized Navier-Stokes solutions of separation and trailing-edge flows
[NASA-TM-84378] N83-29635
NAVIGATION
US Coast Pilot 1. Atlantic Coast: Eastport to Cape Cod (19th Edition)
[PB83-157537] N83-29959
NAVIGATION AIDS
The influence of reference system disparity on navigation and positioning
[AD-A125546] N83-29195
A field visibility comparison between electroluminescent sources and standard US Coast Guard incandescent aids-to-navigation sources
[AD-A125575] N83-30223
NEAR WAKES
Nonuniqueness in wakes and boundary layers
[UTRC83-15] N83-29630
NEODYMIUM LASERS
Solid-state lasers for bathymetry and communications. Studies of four rare-earth materials
[AD-A126098] N83-29683
Laser-fusion (for pedestrians)
[PB83-166470] N83-30265
NERVOUS SYSTEM
Local use of microwave electromagnetic energy on biologically active points N83-29978
Dependence of biological effects of microwave irradiation on exposure intensity and duration N83-29980
NETWORK ANALYSIS
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172904] N83-30060
An elementary approach to the six-port reflectometer, its theory and implementation
[DE82-015514] N83-30233
NEUTRAL ATOMS
Neutral beam heating in stellarators: A numerical approach
[DE83-010458] N83-30242
NEUTRAL PARTICLES
Generalized view factor techniques for treating streaming and scattering in neutral-particle transport
[DE82-014046] N83-30196
Neutral-particle-beam production and injection
[DE83-006966] N83-30201
NEUTRINOS
Neutrino oscillations: Present and future experiments
[DE82-903207] N83-30186
Limits on neutrino-antineutrino transitions from a study of high energy neutrino interactions
[PB83-165944] N83-30213
NEUTRON COUNTERS
The application of Monte Carlo codes to neutron dosimetry
[DE82-017635] N83-30154
NEUTRON CROSS SECTIONS
Nuclear-spectroscopy problems studied with neutrons
[DE82-017303] N83-30192
NEUTRON EMISSION
Investigation of the neutron production phases of a large plasma focus device
[IPF-82-12] N83-30262
NEUTRON SCATTERING
Recently developed methods in neutral-particle transport calculations: Overview
[DE82-014043] N83-30197
Radiation standards and calibrations
[DE82-019748] N83-30200
NEUTRON SOURCES
Tests of a resonance detector spectrometer for electron-volt spectroscopy
[DE83-007611] N83-29666
NEUTRON SPECTRA
The influence of the deviation from the equilibrium deuteron distribution on the neutron spectra in linear pinch geometries
[IPF-82-10] N83-30260
NEUTRON SPECTROMETERS
Tests of a resonance detector spectrometer for electron-volt spectroscopy
[DE83-007611] N83-29666
NEUTRONS
Design of neutron streak camera for fusion diagnostics
[DE82-018393] N83-29662
NEVADA
Remote-reference magnetotelluric survey, Nevada test site and vicinity, Nevada and California
[DE82-019412] N83-29909
NEW MEXICO
Intermediate photovoltaic system application experiment operational performance report. Lovington Square Shopping Center, Lovington, New Mexico for November 1982, volume 17
[DE83-006721] N83-29849
NICKEL ALLOYS
Effect of the test environment on creep crack growth rates for nickel base alloys. A study of creep crack growth in 2219-T851 aluminum alloy using a computerized testing system
[AD-A125698] N83-29361
Radiation-induced microstructural changes in Ni-C and Pt-C alloys
[DE83-007815] N83-29371
NICKEL COATINGS
Structure and properties of nickel-boron-layers
[BMFT-FB-T-82-241] N83-29374
Metal coated optical fibers for sensors
[AD-A126068] N83-30224
NIGHT SKY
Feasibility of night-sky radiation with heat pumps
[DE83-006812] N83-29850
NIOBATES
Ferroelectric thin films for imaging and signaling techniques
[BMFT-FB-T-83-015] N83-30287
NIOBIUM
Superconducting niobium thin-film gradiometer technology program
[AD-A126133] N83-29656
NITRATES
National performance audit program: The 1980 proficiency survey for sulfur dioxide, nitrogen dioxide, carbon monoxide, sulfate, nitrate, lead and high volume flow
[PB83-164863] N83-29354
NITRIC OXIDE
Characterization of tar products from rapid pyrolysis of bituminous coals
[DE83-007272] N83-29346
NITROGEN DIOXIDE
National performance audit program: The 1980 proficiency survey for sulfur dioxide, nitrogen dioxide, carbon monoxide, sulfate, nitrate, lead and high volume flow
[PB83-164863] N83-29354
NITROGEN OXIDES
Pollutant formation in monodisperse fuel spray combustion N83-29213
Gaseous continuous emission monitoring systems. Performance specification guidelines for SO2, NOx, CO2, O2 and TRS
[PB83-161646] N83-29886
NITROGEN 15
Relations between the simultaneous and sequential transfer of 2 nucleons
[DE82-017425] N83-30190
NITROGUANIDINE
Sensitivity characterization of low vulnerability (LOVA) propellants
[AD-A126130] N83-29415
NOBLE METALS
Recovery of precious metals from cyanide solutions, plating baths and liquid residues from homogeneous catalysis processes
[BMFT-FB-T-83-030] N83-29347
GaAs Schottky barrier photo-responsive device and method of fabrication --- photovoltaic cells
[NASA-CASE-GSC-12816-1] N83-30268
NOISE MEASUREMENT
Propellant handler's ensemble in-suit noise measurements
[AD-A125507] N83-30040
Characteristics of the transmission loss apparatus at NASA Langley Research Center
[NASA-CR-172153] N83-30165
Noise test-resilient wheels Massachusetts Bay Transportation Authority green line
[PB83-148635] N83-30329
NOISE POLLUTION
Multidimensional signal restoration and band-limited extrapolation, 2
[AD-A125877] N83-29583
NOISE PREDICTION (AIRCRAFT)
Development of rotorcraft interior. Noise control concepts. Phase 1: Definition study
[NASA-CR-166101] N83-30166
NOISE REDUCTION
Minimum noise impact aircraft trajectories N83-29191
Influence from coriolis and centripetal accelerations on in-service tire vibrations
[PB83-145185] N83-29469
NOISE SPECTRA
Turbulence spectra in the noise source regions of the flow around complex surfaces
[NASA-TM-83392] N83-30168
NOISE TEMPERATURE
Evaluation of an effective medium temperature from radiometric-satellite beacons comparisons N83-29526
NOISE THRESHOLD
Spatial and temporal visual masking and visibility
[AD-A125696] N83-30000
NONDESTRUCTIVE TESTS
Electrothermal response testing: A component development tool
[DE82-012694] N83-29617
Research to develop and evaluate advanced eddy current sensors for detecting small flaws in metallic aerospace components
[AD-A125873] N83-29726
Characterization of material flaws using ultrasonic ramp responses
[DE83-006123] N83-29727
Journal of Research of the National Bureau of Standards, volume 87, number 5, September - October 1982
[PB83-164541] N83-30305
NONLINEAR PROGRAMMING
CAD of control systems: Application of nonlinear programming to a linear quadratic formulation
[NASA-CR-172151] N83-29448
A successive linear programming method and its convergence on nonlinear problems
[AD-A126240] N83-30070

NONLINEAR SYSTEMS
Time scales, coherency, and weak coupling
[AD-A125845] N83-30118
Comparison of linear and nonlinear random field estimators
[PB83-169755] N83-30145
Non-linear regression
[PB83-167643] N83-30146
NONLINEARITY
Finite area method for nonlinear supersonic conical flows
[NASA-CR-172148] N83-29177
NORMAL DENSITY FUNCTIONS
Physical considerations in the analysis and synthesis of hydrologic sequences
[PB83-167593] N83-29938
NORMALITY
Selecting representative points in normal populations
[AD-A125770] N83-30149
NOZZLE GEOMETRY
Parametric study of flame radiation characteristics of a tubular-can combustor
[NASA-TM-83436] N83-29237
NUCLEAR CAPTURE
Gamma decay of unbound states following neutron capture
[DE82-017305] N83-30191
NUCLEAR ELECTRIC POWER GENERATION
A Workshop on Alternative Fusion Concepts and Their Utilization Projections
[PB83-157966] N83-30263
NUCLEAR EXPLOSIONS
Estimates of air-column density evolution behind strong airblasts
[DE82-018313] N83-29645
Advanced seismological research and improved yield determination
[AD-A126001] N83-29895
Seismological discrimination and yield determination research
[AD-A126002] N83-29896
NUCLEAR FISSION
Application of adjusted data in calculating fission-product decay energies and spectra
[DE82-019182] N83-30193
NUCLEAR FUELS
Commercial high-level-waste management: Options and economics. A comparative analysis of the ceramic and glass waste forms
[DE83-006235] N83-30218
NUCLEAR FUSION
Statistical magnetohydrodynamics and reversed-field-pinch quiescence
[DE82-015740] N83-30246
Inertial fusion: An energy-production option for the future
[DE82-019245] N83-30250
A Workshop on Alternative Fusion Concepts and Their Utilization Projections
[PB83-157966] N83-30263
NUCLEAR MAGNETIC RESONANCE
Synthesis and characterization of a new silicone multiblock polymer
[DE82-015189] N83-29406
NUCLEAR PHYSICS
Folding models for elastic and inelastic scattering
[DE82-013458] N83-30189
Some prospects for antiproton physics
[DE82-011582] N83-30199
Numerical studies of the intrinsic charm model
[PB83-164798] N83-30208
Determination of the Alpha parameter for the decay of xi minus into Lambda pi minus
[PB83-164814] N83-30209
Topics in heavy ion reactions
[PB83-164939] N83-30210
Introduction to the possible substructure of quarks and leptons
[PB83-165605] N83-30211
Optical pumping for intense polarized ion sources
[DE82-012136] N83-30231
NUCLEAR REACTIONS
Determination of the Alpha parameter for the decay of xi minus into Lambda pi minus
[PB83-164814] N83-30209
Topics in heavy ion reactions
[PB83-164939] N83-30210
NUCLEAR REACTORS
High thermal power density heat transfer apparatus providing electrical isolation at high temperature using heat pipes
[NASA-CASE-LEW-12950-2] N83-29804
NUCLEAR RESEARCH
Numerical studies of the intrinsic charm model
[PB83-164798] N83-30208
Determination of the Alpha parameter for the decay of xi minus into Lambda pi minus
[PB83-164814] N83-30209
Limits on neutrino-antineutrino transitions from a study of high energy neutrino interactions
[PB83-165944] N83-30213
Spatially and spectraly resolved filamentary structures in the (3/2)omega 0 emission from laser produced plasmas
[PB83-165969] N83-30264
NUCLEAR SCATTERING
Generalized view factor techniques for treating streaming and scattering in neutral-particle transport
[DE82-014046] N83-30196
NUCLEAR STRUCTURE
Electronic isotope shifts muonic atoms and electron scattering
[DE82-014040] N83-30194
Probing the nuclear structure with heavy-ion reactions
[DE82-017316] N83-30195
Nuclear structure in pion scattering and charge exchange
[DE83-007945] N83-30205
NUCLEATION
Solid-liquid contacting in industrial crystalizers and its influence on product size distribution
[WTHD-150] N83-30270
NUCLEONS
Relations between the simultaneous and sequential transfer of 2 nucleons
[DE82-017425] N83-30190
Nuclear structure in pion scattering and charge exchange
[DE83-007945] N83-30205
NUMBER THEORY
Projections of lawless sequences
[MATH-CENTRE-TRACTS-152] N83-30104
NUMERICAL ANALYSIS
Numerical simulation of vortex breakdown by the vortex-filament method
[NASA-TM-84334] N83-29636
Flux-based acceleration of the Euler equations
[NASA-TM-83453] N83-30113
Tables of spherical Bessel functions of the first and second kinds for complex arguments
[AD-A125876] N83-30130
NUMERICAL DIFFERENTIATION
Legendre-Tau approximations for functional differential equations
[NASA-CR-172155] N83-30108
NUMERICAL INTEGRATION
Global-error estimation for stiff ODEs
[DE83-006846] N83-30136
NUSSELT NUMBER
Forced- and natural-convection studies on solar collectors for heating and cooling applications
[DE83-009863] N83-29841
NUTRIENTS
Acidity, nutrients and minerals in atmospheric precipitation over Florida: Deposition patterns, mechanisms and ecological effects
[PB83-165837] N83-29888
NUTRITION
Development of selection criteria and their application in evaluation of CELSS candidate species N83-30021

O

OBSERVATORIES
International Catalog of Geomagnetic Data
[PB83-161679] N83-29921
OCEAN BOTTOM
A data memory system for a seafloor-earthquake-measuring instrument
[DE82-016808] N83-29665
SEASAT observations of lithospheric flexure seaward of trenches
[E83-10353] N83-29751
Constant temperature and thermal gradient investigations of the near field subseabed environment: Chemical and thermodiffusional effects
[DE82-018589] N83-29958
OCEAN CURRENTS
The interaction of short-wavelength internal waves with a background current
[AD-A125822] N83-29581
Assessing very long-range impacts from a rapid climate change
[DE82-017229] N83-29937
OCEAN SURFACE
Microwave multipath from sea reflections: The Bay of Fundy N83-29500
Generalized approach to radio wave scatter from time-varying rough surfaces N83-29537
Measurements of long term radar sea clutter statistics N83-29538
A numerical model for wind-wave prediction in deep water
[AD-A125985] N83-29957
OCEAN TEMPERATURE
Satellite infrared observations of oceanic long waves in the Eastern Equatorial Pacific 1975 to 1981
[PB83-161133] N83-29963
OCEAN THERMAL ENERGY CONVERSION
OTEC plants for todays island market
[DE83-008670] N83-29847
OCEANOGRAPHIC PARAMETERS
The long term upper ocean study (LOTUS) cruise summary and hydrographic data report OCEANUS 119, May 1982
[AD-A125737] N83-29956
OCEANOGRAPHY
A plan for optical oceanography R&D to support MC&G
[AD-A126215] N83-29955
OCEANS
Dynamics of ocean and atmosphere on basis of observations from Salyut-6 N83-29286
A distributed network supporting ocean surveillance
[AD-A125559] N83-29954
OFFSHORE PLATFORMS
A data memory system for a seafloor-earthquake-measuring instrument
[DE82-016808] N83-29665
OHMIC DISSIPATION
Relativistic two-dimensional theory of RF current drive
[DE83-010250] N83-29613
OIL POLLUTION
Microbial degradation of oil: Research and development 1982, TOBOS 85 program — techniques for oil combat and clean-up (TOBOS 85)
[FOA-C-40167-B4] N83-29881
OILS
Oil from plants
[DE83-009141] N83-29846
OMNIDIRECTIONAL ANTENNAS
Multistatic sonar with omnidirectional receivers
[REPT-10-82] N83-29486
OPEN CHANNEL FLOW
Prediction of flow depth and sediment discharge in open channels
[PB83-165696] N83-29468
OPENINGS
Vacuum inductive store/pulse compression experiments on a high power accelerator using plasma opening switches
[AD-A126268] N83-30176
OPERATING SYSTEMS (COMPUTERS)
Basic JCL for the CRAY-1 operating system (COS) with emphasis on making the transition from CDC 7600/SCOPE
[NASA-CR-166499] N83-30053
Resource sharing in a network of personal computers
[AD-A126003] N83-30096
OPERATIONAL PROBLEMS
Operational and maintenance aspects of the introduction of an advanced fighter type N83-29250
Satellite freeze forecast system. Operating/troubleshooting manual
[E83-10371] N83-29781
OPERATIONS RESEARCH
Invariant multiplicative efficiency and piecewise Cobb-Douglas envelopments
[AD-A126239] N83-30157
OPERATORS (MATHEMATICS)
Microcomputers in transportation. Volume 1: Selected readings
[PB83-169904] N83-30048
OPERATORS (PERSONNEL)
Voice-communication testing using naive and experienced communicators
[AD-A126109] N83-29568
Advanced tools for software maintenance
[AD-A126146] N83-30071
OPTICAL COMMUNICATION
Integrated optical transmitter and receiver
[AD-A125493] N83-29575
Solid-state lasers for bathymetry and communications. Studies of four rare-earth materials
[AD-A126098] N83-29683
OPTICAL CORRECTION PROCEDURE
ART and SIRT correction factors in geotomography — algebraic reconstruction technique (ART); simultaneous iterative reconstruction technique (SIRT) N83-29539
OPTICAL EQUIPMENT
Optical signal processing
[AD-A125609] N83-29599
Bibliography of Soviet laser developments, no. 55, September - October 1981
[AD-A126022] N83-29686

A plan for optical oceanography R&D to support MC&G
[AD-A126215] N83-29955
OPTICAL FILTERS
Generalized matched filters
[AD-A126319] N83-29606
OPTICAL MEASURING INSTRUMENTS
Optical orientation in space N83-29282
OPTICAL PUMPING
Search for far infrared radiation from optically pumped defect modes
[AD-A125940] N83-29685
Optical pumping for intense polarized ion sources
[DE82-012136] N83-30231
OPTICAL RADAR
Heterodyne detector/electronics design and alignment of a pulsed CO2 laser wind system
[AD-A126264] N83-29682
OPTIMAL CONTROL
The modern concept of acceleration control: Introduction to optimal command in a handling by objective structure N83-29267
Design, implementation and flight testing of PIF autopilots for general aviation aircraft
[NASA-CR-3709] N83-29270
Singular perturbations and time-scale methods in control theory: Survey 1976-1982
[AD-A125908] N83-30100
OPTIMIZATION
Mechanical and thermal effects on the transient and steady state component performance of gas turbines N83-29252
CAD of control systems: Application of nonlinear programming to a linear quadratic formulation
[NASA-CR-172151] N83-29448
Delayed binding in PQCC generated compilers
[AD-A125935] N83-30044
Multivariable internal model control
[DE83-007320] N83-30101
The inclusion principle for dynamic systems
[DE83-006412] N83-30140
Non-linear regression
[PB83-167643] N83-30146
ORBITAL MECHANICS
Proving the Space Transportation System: The orbital flight test program
[NASA-FACTS-137-83] N83-29298
OREGON
Sensing systems for measuring mechanical properties in ground masses. Volume 4: Static penetrometer
[PB83-155978] N83-29794
ORGANIC COMPOUNDS
Circular differential scattering is an important part of the circular dichroism of macromolecules
[DE83-007022] N83-29405
Organic geochemistry of deep ground waters — Washington state and Sweden
[DE83-005333] N83-29787
Oil from plants
[DE83-009141] N83-29846
VOC (Volatile Organic Compound) fugitive emissions in petroleum refining industry: Background information for proposed standards
[PB83-157743] N83-29885
ORGANIC MATERIALS
Literature review of organic matter transport from marshes
[E83-10352] N83-29750
ORGANIZATIONS
National severe local storms operations plan
[PB83-163998] N83-29940
ORGANOMETALLIC COMPOUNDS
Gem-difluoroallyllithium: Preparation by lithium-halogen exchange and utilization in organosilicon and organic synthesis
[AD-A126094] N83-29328
Organosilicon compounds and organosilicon polymer intermediates
[AD-A127752] N83-29403
ORGANS
USSR report: Life sciences. Effects of nonionizing electromagnetic radiation, no. 10
[JPRS-83745] N83-29973
OROGRAPHY
Continuing design work for the Sierra Cooperative Pilot Project
[PB83-164236] N83-29945
ORTHO HYDROGEN
Cooling by conversion of para to ortho-hydrogen
[NASA-CASE-GSC-12770-1] N83-29324
ORTHO PARA CONVERSION
Cooling by conversion of para to ortho-hydrogen
[NASA-CASE-GSC-12770-1] N83-29324
OSCILLATIONS
Influence of raindrop oscillations on coherent forward scattering of microwaves in rain N83-29528
Higgs mass scales and matter-anti-matter oscillations in grand unified theories
[DE82-017636] N83-30294
OSCILLATORS
Start-up of a pulsed beam Free Electron Laser (FEL) oscillator
[AD-A126306] N83-29684
OTS (ESA)
Results obtained from attenuation measurements of the Deutsche Bundespost OTS propagation experiment N83-29510
First global results of the European Space Agency OTS propagation campaign N83-29511
Correlation between various radioelectrical data at 11.4, 11.6, and 35 GHz — OTS and radiometer data N83-29513
OUTER SPACE TREATY
Legal delimitation of airspace N83-29290
OUTPUT
High voltage power supply
[NASA-CASE-GSC-12818-1] N83-29594
OXIDATION
Tri-State Synfuels project commercial scale coal test. Volume 2A: Collection and shipment mine, barge, ship and train programs
[DE83-007443] N83-29431
Emission characterization of a spark-ignited, heavy-duty, direct-injected methanol engine
[PB83-156372] N83-29722
Effect of low-intensity superhigh-frequency energy on respiration and oxidative phosphorylation of organ mitochondria and activity of some blood enzymes N83-29975
Wet oxidation as a waste treatment method in closed systems N83-30030
OXIDATION-REDUCTION REACTIONS
Formation of aromatic and possible oligomeric materials from cellulose liquefaction
[DE83-005558] N83-29432
OXIDE FILMS
Method of forming oxide coatings — for solar collector heating panels
[NASA-CASE-LEW-13132-1] N83-29388
OXYGEN
Oxygen diffusion of anodic surface oxide film on titanium studied by Auger electron spectroscopy
[DE82-013653] N83-29340
Oxygen and titanium sputtering yields as determined by laser fluorescence and Auger electron spectroscopy for monolayer oxygen coverage of polycrystalline Ti
[DE83-007683] N83-29373
Gaseous continuous emission monitoring systems. Performance specification guidelines for SO2, NOx, CO2, O2 and TRS
[PB83-161646] N83-29886
Workshop on Detection and Measurement of Pulmonary Oxygen Toxicity
[AD-A125821] N83-30003
Photoionization research on atomic beams. 2: The photoionization cross section of atomic oxygen
[NASA-TM-77106] N83-30173
Molecular beam chemistry: Reactions of oxygen atoms with halogen molecules
[AD-A125870] N83-30175
OXYGEN ATOMS
Studies on production results in the reaction of oxygen atoms with ethylene
[MPIS-18/1982] N83-30206
OXYGEN BREATHING
CO2 retention and ECG changes in exercise during prolonged hyperbaric N2-O2 breathing
[AD-A125403] N83-30002
OXYGEN CONSUMPTION
Development of the cone calorimeter, a bench scale heat release rate apparatus based on oxygen consumption
[PB83-151266] N83-29673
OXYGEN MASKS
Evaluation of high performance aircrew helmets and oxygen masks
[AD-A126036] N83-30038
OXYGEN PRODUCTION
Process for producing oxygen
[DE83-006648] N83-29344
OZONE
Mechanisms of stratospheric ozone transport N83-29892
The 1980 stratospheric-tropospheric exchange experiment
[NASA-TM-84297] N83-29924

P

P-N JUNCTIONS
Methods of submicron analysis as assistance for semiconductor technology
[BMFT-FB-T-83-032] N83-30288
PACIFIC OCEAN
Vertical sections of temperature, salinity, thermosteric anomaly, and zonal geostrophic velocity from Norpax shuttle experiment, part 3
[PB83-169961] N83-29960
Feasibility study of mitigating tsunami hazards in the Pacific
[PB83-156885] N83-29966
PACKAGING
Plastics in the 80's
[PB83-163311] N83-29409
PAINTS
Reduced-pollution corrosion-protection systems
[PB83-153056] N83-29378
Epoxy thermoplastic pavement marking material: Summary of research results and revised specifications
[PB83-164848] N83-29475
PALLADIUM
Palladium electrolytes for use in selective plating processes
[BMFT-FB-T-83-024] N83-29376
PANEL METHOD (FLUID DYNAMICS)
A continuous vorticity panel method for the prediction of steady aerodynamic loads on lifting surfaces N83-29172
Subsonic panel method for designing wing surfaces from pressure distribution
[NASA-CR-3713] N83-29198
PANELS
Method of forming oxide coatings — for solar collector heating panels
[NASA-CASE-LEW-13132-1] N83-29388
Daze fasteners
[NASA-CASE-LAR-13009-1] N83-29706
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172904] N83-30060
PAPER (MATERIAL)
Development of a process to produce alcohol at paper mills
[DE83-009668] N83-29422
PARA HYDROGEN
Cooling by conversion of para to ortho-hydrogen
[NASA-CASE-GSC-12770-1] N83-29324
PARABOLIC REFLECTORS
Influence of adhesive shear deformation on laminate structural behavior with application to parabolic trough solar collectors
[DE83-010293] N83-29838
PARACHUTES
Extended moment arm anti-spin device
[NASA-CASE-LAR-12979-1] N83-29173
PARALLEL PROCESSING (COMPUTERS)
Memory-based parallel data output controller
[NASA-CASE-GSC-12447-2] N83-29302
Design of a high-speed digital processing element for parallel simulation
[NASA-TM-83373] N83-29597
High-performance banded equation solver for the CRAY-1. Part 2: The symmetric case
[AD-A125560] N83-30127
PARAMETER IDENTIFICATION
Importance of active sites for char gasification in oxygen (air) and carbon dioxide
[PB83-173393] N83-29445
Analysis of multipath fading observations on certain microwave paths in British Columbia N83-29498
Experimental investigations of elastohydrodynamic lubrication
[NASA-TM-81698] N83-29711
Comparison of linear and nonlinear random field estimators
[PB83-169755] N83-30145
PARTIAL DIFFERENTIAL EQUATIONS
Development of the GEM (General Elliptic Marching) package: User-oriented codes for general discretized elliptic and mixed partial differential equations
[AD-A125897] N83-30131
Locally one dimensional numerical methods for multi-dimensional free surface problems
[AD-A125902] N83-30133
PARTICLE ACCELERATORS
Accelerator mass spectrometry: From nuclear physics to dating
[DE83-007863] N83-29342
Active tuning of rf cavities
[DE83-007126] N83-29586

Creation of high energy electron tails due to the modified 2-stream instability
[NASA-CR-172819] N83-30171

PARTICLE BEAMS
Rand data base of Soviet high-current particle-beam R&D
[AD-A125536] N83-30181

PARTICLE DIFFUSION
Diffusion-flame studies of the chemical and physical mechanisms of soot formation from aromatic and substituted-aromatic fuels
[DE83-009093] N83-29334

PARTICLE FLUX DENSITY
The application of Monte Carlo codes to neutron dosimetry
[DE82-017635] N83-30154

PARTICLE INTERACTIONS
Theoretical investigations of particle behavior in the high velocity domain --- test particles in high velocity flow
[IFD-2/82] N83-29183
Recently developed methods in neutral-particle transport calculations: Overview
[DE82-014043] N83-30197

PARTICLE MOTION
Theoretical investigations of particle behavior in the high velocity domain --- test particles in high velocity flow
[IFD-2/82] N83-29183
Optically Recording Velocity Interferometer System (ORVIS) for subnanosecond particle-velocity measurements in shock waves
[DE82-017621] N83-29659

PARTICLE PRODUCTION
Survey of models of baryon production in e plus e minus annihilation
[PB83-166850] N83-30212

PARTICLE SIZE DISTRIBUTION
Fuel spray diagnostics N83-29212
Pollutant formation in monodisperse fuel spray combustion N83-29213
Relative catalytic activity of iron containing minerals for the hydrogasification of coal
[DE82-012776] N83-29337
Studies of dry-powder extinguishment of diffusion flames for condensed fuels
[PB83-150656] N83-29348
Line-sinter processing of anorthosite for the recovery of alumina
[PB83-148435] N83-29379
Design and development of a disc-windmill atomizer for aerial applications
[AE-8223] N83-29449
Atomizers for the aerial application of herbicides: Ideal and available
[CA-8207] N83-29632

PARTICLE SPIN
Particle physics experiments, 1981
[PB83-164715] N83-30207

PARTICLE THEORY
Scattering by spheroidal and rough particles
[AD-A125767] N83-29558

PARTICLES
Wear particle atlas, revised
[AD-A125512] N83-29402

PARTICULATE SAMPLING
NBS portable ambient particulate sampler
[PB83-165019] N83-29679

PARTITIONS (MATHEMATICS)
Layout algorithms for the design of very large scale integrated circuits using partitioning
[BMFT-FB-T-83-018] N83-29620

PATENT APPLICATIONS
Quantum dynamical model for laser excitation of a two-level adatom: Surface-dressed Bloch equations
[AD-A126201] N83-29696

PATHOGENESIS
Workshop on Detection and Measurement of Pulmonary Oxygen Toxicity
[AD-A125821] N83-30003

PATHOGENS
Adequacy of disinfection for control of newly recognized waterborne pathogens
[PB83-152181] N83-29884

PATHOLOGY
Autoallergic effects of microwave electromagnetic energy and their influence on the fetus and offspring N83-29974
Influence of prolonged illumination of the rabbit retina by monochromatic light on its functional state N83-29979

PATTERN RECOGNITION
Optical signal processing
[AD-A125609] N83-29599
Generalized matched filters
[AD-A126319] N83-29606
Objective acoustic quality inspection by pattern recognition and signal analysis. Design of an inspection system and application to an electric motor
[BMFT-FB-T-83-005] N83-29619
Analytical design of multispectral sensors
[E83-10337] N83-29748
Understanding objects, features and backgrounds
[AD-A125514] N83-30013

PAVEMENTS
Latex improvement of recycled asphalt pavement
[PB83-152694] N83-29460
Field environmental evaluation plan for sulfur use in pavements
[PB83-156687] N83-29461
Epoxy thermoplastic pavement marking material: Summary of research results and revised specifications
[PB83-164848] N83-29475

PAYLOAD RETRIEVAL (STS)
Satellite retrieval system
[NASA-CASE-MFS-25403-1] N83-29303

PAYLOADS
Teleoperator maneuvering system benefits assessment, volume 2
[NASA-CR-170796] N83-30035
PDSS/IMC requirements and functional specifications
[NASA-CR-170801] N83-30055

PEELING
Elastomer toughened polyimide adhesives
[NASA-LAR-12775-2] N83-29390

PELLETS
Line-sinter processing of anorthosite for the recovery of alumina
[PB83-148435] N83-29379
In-plant recycling of stainless and other specialty steelmaking wastes. Report on investigations, 1982
[PB83-157701] N83-29382

PENETROMETERS
Sensing systems for measuring mechanical properties in ground masses. Volume 4: Static penetrometer
[PB83-155978] N83-29794

PERCEPTION
Competitive argumentation in computational theories at cognition
[AD-A125577] N83-30009
The measurement of motivational style: A format modification
[AD-A125756] N83-30014

PERFORMANCE PREDICTION
Models for predicting tip clearance changes in gas turbines N83-29255

PERFORMANCE TESTS
Residential combustion heating system performance analysis study
[PB83-161406] N83-29481
Minimum operational performance standards for emergency locator transmitters. Automatic fixed, ELT (AF); automatic portable, ELT (AP); automatic deployable, ELT (AD); survival, ELT (S) operating on 121.5 and 243.0 megahertz
[RTCA/DO-183] N83-29488
Solar energy system performance evaluation. Scottsdale Courthouse, Scottsdale, Arizona, March, April, July, August, and October 1981 through February 1982
[DE82-019030] N83-29854
Evaluation of high performance aircrew helmets and oxygen masks
[AD-A126036] N83-30038

PERICLASE
Influence of selected additives and CaO:SiO2 ratio on high-temperature strength of MgO refractories
[PB83-157875] N83-29410

PERIODIC VARIATIONS
Soil temperature investigations using satellite acquired thermal-infrared data in semi-arid regions --- Utah
[E83-10355] N83-29753
Quasi periodicity in local bifurcation theory
[PB83-165092] N83-30144

PERMEABILITY
Countercurrent reverse osmosis for ethanol-water separation
[DE83-009725] N83-29333
Membrane separations in chemical processing
[PB83-165068] N83-29355
Pyrotechnic deflagration velocity and permeability
[DE82-014100] N83-29428

PERMITTIVITY
Some X-band measurements of the dielectric constant of dust N83-29514
Measurements of the complex refractive index of soils and airborne particles N83-29515

PERSONALITY
Components of individual differences in human intelligence
[AD-A125633] N83-30012

PERSONNEL
Masonry structural design for buildings
[AD-A126314] N83-29452

PERTURBATION
Singular perturbations and time-scale methods in control theory: Survey 1976-1982
[AD-A125908] N83-30100

PERTURBATION THEORY
Wave scattering by random surfaces and application to natural surfaces N83-29497
A new perturbation expansion for electromagnetic scattering by stochastic surfaces N83-29536
Analytical nonsingular theory for geopotential perturbations including resonance effects
[DFVLR-FB-82-28] N83-29915

PETN
Kinetics of the thermal decomposition of solid PETN
[DE82-004368] N83-29425

PETROLEUM PRODUCTS
VOC (Volatile Organic Compound) fugitive emissions in petroleum refining industry: Background information for proposed standards
[PB83-157743] N83-29885

PHASE CHANGE MATERIALS
Predictions of entry heating for lower surface of shuttle orbiter
[NASA-TM-84624] N83-29631

PHASE DIAGRAMS
Phase equilibria and transition in mixtures of a homopolymer and a block copolymer. 1: Small-angle X-ray scattering study
[AD-A125818] N83-29396

PHASE TRANSFORMATIONS
Phase equilibria and transition in mixtures of a homopolymer and a block copolymer. 1: Small-angle X-ray scattering study
[AD-A125818] N83-29396

PHASE VELOCITY
Theory of current drive with lower hybrid waves
[DE82-017216] N83-30243
Theory of runaway-current sustainment by lower-hybrid waves
[DE82-017213] N83-30254

PHASED ARRAYS
The Norwegian seismic array (NORSAR)
[AD-A126249] N83-29898

PHOSPHATES
The adsorption and thermal decomposition of tricresylphosphate (TCP) on iron and gold
[NASA-TM-83341] N83-29311
The hydrolysis of phosphate esters on solids
[AD-A126119] N83-29329

PHOSPHORIC ACID FUEL CELLS
Electrochemistry of fuel cells for transportation applications
[DE82-008115] N83-29819

PHOSPHORYLATION
Effect of low-intensity superhigh-frequency energy on respiration and oxidative phosphorylation of organ mitochondria and activity of some blood enzymes N83-29975

PHOTOCATHODES
The generation of near millimeter radiation by picosecond pulse demodulation
[AD-A125510] N83-29576

PHOTOCHEMICAL REACTIONS
Semiconductor electrodes. 50: Effect of mode of illumination and doping on photoelectrochemical behavior of phthalocyanine films
[AD-A125856] N83-30274

PHOTODIODES
A system for measuring energy and peak power of low-level 1.064 micrometer laser pulses
[PB83-165027] N83-29703

PHOTOELASTIC ANALYSIS
Stress intensity factor distribution for natural flaws grown under mode 1 loading using 3-d photoelasticity N83-29730

PHOTOELECTRIC CELLS
Semiconductor electrodes. 50: Effect of mode of illumination and doping on photoelectrochemical behavior of phthalocyanine films
[AD-A125856] N83-30274

PHOTOELECTRIC EMISSION
Laser-activated electrical switching characteristics of high-current, low-loss thermionic diodes
[AD-A125521] N83-29609

PHOTOELECTRON SPECTROSCOPY
Multiphoton ionization and third-harmonic generation in atoms and molecules
[DE82-015748] N83-30185

PHOTOGEOLOGY
Utilization of LANDSAT multispectral data in geobotanical investigations: The location of ironstone gravel in the Sam Houston National Forest
[E83-10361] N83-29772

PHOTOGRAMMETRY
Water penetration photogrammetry. Volume 1: Feasibility and evaluation study
[AD-A126209] N83-29291
PHOTOGRAPHIC EQUIPMENT
Foreign technology alert-bibliography: Photography and recording devices. Citations from the NTIS data base
[PB83-101626] N83-29676
PHOTOGRAPHIC RECORDING
Foreign technology alert-bibliography: Photography and recording devices. Citations from the NTIS data base
[PB83-101626] N83-29676
PHOTOGRAPHY
Fuel fire tests of selected assemblies
[AD-A125820] N83-29450
PHOTOIONIZATION
Photoionization research on atomic radiation. 3: The ionization cross section of atomic nitrogen
[NASA-TM-77107] N83-30172
Photoionization research on atomic beams. 2: The photoionization cross section of atomic oxygen
[NASA-TM-77106] N83-30173
Multiphoton ionization and third-harmonic generation in atoms and molecules
[DE82-015748] N83-30185
PHOTOLITHOGRAPHY
Superconducting niobium thin-film gradiometer technology program
[AD-A126133] N83-29656
PHOTOLUMINESCENCE
Materials characterization of silicon and analysis of recombination processes and impurities
[BMFT-FB-T-83-06] N83-30291
PHOTOLYSIS
Kinetic studies of gas phase free radicals
[AD-A125516] N83-29688
PHOTOMASKS
Superconducting niobium thin-film gradiometer technology program
[AD-A126133] N83-29656
PHOTOMETRY
An investigation of the basic characteristics of the radiation of straight xenon flash tubes
[DE82-016680] N83-29614
PHOTOMICROGRAPHY
Wear particle atlas, revised
[AD-A125512] N83-29402
PHOTONS
Exploration of new methods to produce efficient sources of coherent near millimeter wave radiation
[AD-A125772] N83-29559
PHOTORECEPTORS
Color Vision Conference
[AD-A125435] N83-30001
PHOTOSENSITIVITY
Integrated circuits for optical sensing and display techniques
[BMFT-FB-T-83-052] N83-29622
PHOTOSYNTHESIS
Biochemical and physiological characterization of higher plants with reduced photorespiration
[DE83-007949] N83-29972
Candidate species selection: Cultural and photosynthetic aspects N83-30022
Studies on maximum yield of wheat and other small grains in controlled environments N83-30024
PHOTOVOLTAGES
Maintenance-free 100 ampere-hour, lead acid battery for deep discharge, photovoltaic applications
[DE82-018633] N83-29821
PHOTOVOLTAIC CELLS
FSA field test report, 1980 - 1982
[NASA-CR-172863] N83-29808
Applications of ethylene vinyl acetate as an encapsulation material for terrestrial photovoltaic modules
[NASA-CR-172862] N83-29809
Establishment and furnishing of the Photovoltaic Center for the Southwest Residential Experiment Station
[DE82-904018] N83-29825
Intermediate photovoltaic system application experiment operational performance report for G. N. Wilcox Memorial Hospital, Kauai, Hawaii for October 1982, volume 6
[DE83-006415] N83-29834
Intermediate photovoltaic system application experiment operational performance report. Lovington Square Shopping Center, Lovington, New Mexico for November 1982, volume 17
[DE83-006721] N83-29849
GaAs Schottky barrier photo-responsive device and method of fabrication — photovoltaic cells
[NASA-CASE-GSC-12816-1] N83-30268
PHOTOVOLTAIC EFFECT
FSA field test report, 1980 - 1982
[NASA-CR-172863] N83-29808
Intermediate photovoltaic system application experiment operational performance report. Lovington Square Shopping Center, Lovington, New Mexico for November 1982, volume 17
[DE83-006721] N83-29849
PHTHALOCYANIN
Semiconductor electrodes. 50: Effect of mode of illumination and doping on photoelectrochemical behavior of phthalocyanine films
[AD-A125856] N83-30274
PHYSIOLOGICAL EFFECTS
Chronic consumption of a low sodium diet: Hormonal and physiological effects during exercise in the heat
[AD-A124936] N83-29997
PHYSIOLOGICAL RESPONSES
Brain responses and information processing 3: Hemispheric asymmetry in event related potentials and performance during discrimination of line orientation and velocity of motion
[AD-A125681] N83-30011
The measurement of motivational style: A format modification
[AD-A125756] N83-30014
PHYSIOLOGY
Domestic swine in physiological research. Part 4: A blood acid-base curve nomogram for immature pigs
[AD-A126031] N83-29971
PIEZOELECTRIC TRANSDUCERS
Piezoelectric deicing device
[NASA-CASE-LEW-13773-1] N83-29197
PIEZOMETERS
Sensing systems for measuring mechanical properties in ground masses. Volume 3: Vane shear and cone piezometer
[PB83-155960] N83-29793
PILOT PERFORMANCE
Some general topics in the field of engine handling N83-29242
The criteria used for assessing acceptable engine handling on UK military aircraft N83-29244
Handling combat engines: The pilots viewpoint --- Mirage 2000 aircraft N83-29247
PILOT PLANTS
Transco medium-Btu coal gasification project. Executive summary
[DE82-009598] N83-29418
Development of alcohol-based synthetic transportation fuels from coal-derived synthesis gases
[DE83-004857] N83-29434
PINCH EFFECT
The axisymmetric instability of a self-pinched beam with a rounded radial density profile
[AD-A126117] N83-30178
PIONEER VENUS SPACECRAFT
Pioneer Venus
[NASA-SP-461] N83-30340
PIONS
Nuclear structure in pion scattering and charge exchange
[DE83-007945] N83-30205
PIPE FLOW
Gas/liquid separation in transient flow preproject
[PB83-171041] N83-29352
Thresholds for the onset of fluid and magnetofluid turbulence
[DE82-017202] N83-29642
PIPELINES
Corrosion control: Why the laboratory needs to be involved
[PB83-152009] N83-29380
PIPER AIRCRAFT
Variable acuity remote viewing system flight demonstration
[NASA-CR-170404] N83-29204
PIPES (TUBES)
Dynamic-pressure measurements using an electronically scanned pressure module
[NASA-TM-84650] N83-29655
Optical probe for steam-generator-tube dent measurement
[DE83-901484] N83-29668
Investigation of the conservatism associated with different combinations between primary and secondary piping responses
[DE83-007417] N83-29740
Feasibility of a free-standing insertable heat source
[DE82-014207] N83-29867
PISTONS
Centrifugal-reciprocating compressor
[NASA-CASE-NPO-14597-2] N83-29708
PITCH (INCLINATION)
Mod-2 wind turbine system development. Volume 1: Executive summary
[NASA-CR-168006] N83-29812
PITCH (MATERIAL)
Nonequilibrium disclinations in the carbonaceous mesophase
[AD-A125807] N83-29395
PLANETARY ATMOSPHERES
Planetary atmospheres program
[NASA-CR-172879] N83-30339
PLANETARY ENVIRONMENTS
Publications of the exobiology program for 1982. A special bibliography
[NASA-TM-85837] N83-30041
PLANETARY MAGNETIC FIELDS
Io escape and ionization of atmospheric gases
[NASA-CR-172885] N83-30336
Currents in Saturn's magnetosphere
[NASA-TM-85055] N83-30345
PLANETARY ORBITS
Vibration in planetary gear systems with unequal planet stiffnesses
[NASA-TM-83428] N83-29709
PLANETARY WAVES
Mechanisms of stratospheric ozone transport N83-29892
Satellite infrared observations of oceanic long waves in the Eastern Equatorial Pacific 1975 to 1981
[PB83-161133] N83-29963
PLANT STRESS
Utilization of LANDSAT multispectral data in geobotanical investigations: The location of ironstone gravel in the Sam Houston National Forest
[E83-10361] N83-29772
PLANTS (BOTANY)
Hydropyrolysis of biomass to produce liquid hydrocarbon fuels
[DE83-009985] N83-29420
Remote sensing investigations of wetland biomass and productivity for global biosystems research N83-29767
Oil from plants
[DE83-009141] N83-29846
Water-hyacinth production primary and advanced treatment of wastewater
[DE83-006033] N83-29880
Biochemical and physiological characterization of higher plants with reduced photorespiration
[DE83-007949] N83-29972
Candidate species selection and controlled environment injuries N83-30023
Plant growth in controlled environments in response to characteristics of nutrient solutions N83-30026
To produce nutrients for plant growth N83-30027
PLASMA CONTROL
Neutral-particle-beam production and injection
[DE83-006966] N83-30201
Fusion Energy Workshop
[PUBL-97-128] N83-30236
Neutral beam heating in stellarators: A numerical approach
[DE83-010458] N83-30242
Physical and engineering constraints for Tokamak reactors and helical coils
[DE82-019251] N83-30247
Time-resolved X-ray line diagnostics of laser-produced plasmas
[DE82-015165] N83-30249
Laser-fluorescence measurements of hydrogen and metal densities in the doublet 3 Tokamak
[DE83-008499] N83-30251
Topics in plasma instabilities: Trapped-particle modes and MHD
[DE82-019194] N83-30253
PLASMA DIAGNOSTICS
Plasma etching, processes and diagnostic
[BMFT-FB-T-83-041] N83-30256
PLASMA DYNAMICS
Investigation of the neutron production phases of a large plasma focus device
[IPF-82-12] N83-30262
PLASMA EQUILIBRIUM
The influence of the deviation from the equilibrium deuteron distribution on the neutron spectra in linear pinch geometries
[IPF-82-10] N83-30260
PLASMA ETCHING
Plasma etching, processes and diagnostic
[BMFT-FB-T-83-041] N83-30256
PLASMA FOCUS
Ion acceleration in the plasma focus
[IPF-82-6] N83-30257
Self organization phenomena in the plasma focus
[IPF-82-9] N83-30259
Investigation of the neutron production phases of a large plasma focus device
[IPF-82-12] N83-30262

PLASMA GENERATORS
Modification of a plasma-therm inductively coupled plasma supply to enable RF power modulation
[AD-A126232] N83-30237
PLASMA HEATING
Relativistic two-dimensional theory of RF current drive
[DE83-010250] N83-29613
Neutral beam heating in stellarators: A numerical approach
[DE83-010458] N83-30242
PLASMA INTERACTIONS
Optical-scattering measurements from 1.06-micron, 0.53-micron, and 0.35-micron laser-heated disk targets
[DE82-015418] N83-30232
PLASMA JETS
Process parameter effects on arc physics and heat flow in GTAW
[DE82-017269] N83-29717
PLASMA OSCILLATIONS
The axisymmetric instability of a self-pinched beam with a rounded radial density profile
[AD-A126117] N83-30178
PLASMA PHYSICS
Oxygen and titanium sputtering yields as determined by laser fluorescence and Auger electron spectroscopy for monolayer oxygen coverage of polycrystalline Ti
[DE83-007683] N83-29373
Formation of quark-gluon plasma in nuclear collisions
[DE82-018521] N83-30184
Major disruptions, inverse cascades and the Strauss equations
[DE82-017188] N83-30252
Laser-fusion (for pedestrians)
[PB83-166470] N83-30265
PLASMA PINCH
Beta increase in a belt pinch plasma by fast magnetosonic wave heating
[IPF-82-11] N83-30261
PLASMA RADIATION
Modeling of imploded annular plasmas
[AD-A126179] N83-30238
PLASMA SPECTRA
Plasma etching, processes and diagnostic
[BMFT-FB-T-83-041] N83-30256
PLASMA SPRAYING
Creep of plasma sprayed zirconia
[NASA-CR-167868] N83-29393
PLASMA TORCHES
Hanford solid-waste handling facility strategy
[DE82-017163] N83-30215
PLASMA TURBULENCE
Major disruptions, inverse cascades and the Strauss equations
[DE82-017188] N83-30252
Self organization phenomena in the plasma focus
[IPF-82-9] N83-30259
PLASMA WAVES
Theory of current drive with lower hybrid waves
[DE82-017216] N83-30243
Theory of runaway-current sustainment by lower-hybrid waves
[DE82-017213] N83-30254
Numerical solution of plasma wave phenomena
[IPF-82-8] N83-30258
PLASMA-ELECTROMAGNETIC INTERACTION
High-power generation of microwave and infrared radiation
[AD-A125953] N83-30161
PLASMAS (PHYSICS)
Modeling of imploded annular plasmas
[AD-A126179] N83-30238
Statistical magnetohydrodynamics and reversed-field-pinch quiescence
[DE82-015740] N83-30246
Density and potential measurements in an intense ion-beam-generated plasma
[DE82-018803] N83-30248
PLASTIC DEFORMATION
Hydrogen attack of bainitic 2 1/4 Cr-1Mo steel
[DE82-019169] N83-29370
Latex improvement of recycled asphalt pavement
[PB83-152694] N83-29460
PLATES (TECTONICS)
Plate tectonic behaviour in the east Mediterranean region to be detected by baseline variations from satellite laser ranging
[PB83-159772] N83-29920
PLATINUM
Platinum availability - market economy countries: A minerals availability system appraisal
[PB83-156869] N83-29385
PLATINUM ALLOYS
Radiation-induced microstructural changes in Ni-C and Pt-C alloys
[DE83-007815] N83-29371
PLUMES
Dual tracer measurements of plume depletion
[DE83-005551] N83-29873
Airborne field study of power plant plume dispersion in stable atmospheres
[PB83-168930] N83-29887
PLYWOOD
Blast attenuation in a shot tunnel using water jets
[DE82-018508] N83-29646
POINT DEFECTS
Grain-boudary-diffusion mechanisms in metals
[DE82-018814] N83-30280
POINT SPREAD FUNCTIONS
Spatial resolution estimation of LANDSAT-4 TM and MSS data N83-29766
POINT TO POINT COMMUNICATION
Steady state performance of survivable routing procedures for circuit-switched mixed-media networks
[AD-A126213] N83-29610
Fiber optics in aircraft applications
[AD-A126165] N83-30230
POINTS (MATHEMATICS)
Spacefilling curves and routing problems in the plane
[AD-A126309] N83-30125
A finite flag-transitive geometry of extended G2-type
[MC-ZW-176/82] N83-30141
Comparison of linear and nonlinear random field estimators
[PB83-169755] N83-30145
POISSON EQUATION
Density and potential measurements in an intense ion-beam-generated plasma
[DE82-018803] N83-30248
POLAR WANDERING (GEOLOGY)
Theories of nutation and polar motion III
[AD-A126289] N83-29902
POLARIZATION (SPIN ALIGNMENT)
Polarized E + - polarized p colliding beams: Physics issues
[DE83-006645] N83-30295
POLARIZATION (WAVES)
Third order polarization for multifrequency coherent anti-Stokes Raman scattering
[AD-A125434] N83-29330
POLARIZED LIGHT
Circular differential scattering is an important part of the circular dichroism of macromolecules
[DE83-007022] N83-29405
POLARIZED RADIATION
Scattering by spheroidal and rough particles
[AD-A125767] N83-29558
Optical pumping for intense polarized ion sources
[DE82-012136] N83-30231
POLICIES
A Workshop on Alternative Fusion Concepts and Their Utilization Projections
[PB83-157966] N83-30263
Space science research in the US: A technical memorandum
[PB83-166512] N83-30303
MEDLARS and health information policy
[PB83-168658] N83-30318
POLLUTION
Pollutant formation in monodisperse fuel spray combustion N83-29213
Reduced-pollution corrosion-protection systems
[PB83-153056] N83-29378
POLLUTION CONTROL
Summary of status of Environmental Protection Agency (EPA), Office of Mobile Sources Characterization Projects as of March, 1982
[PB83-163972] N83-29441
Warm air systems. Part 1: Temperatures and temperature efficiencies
[PB83-148908] N83-29484
Evaluation of synthetic-fuel-character effects on rich-lean stationary-gas-turbine combustion systems. Volume 1: Subscale test program
[DE83-901452] N83-29715
VOC (Volatile Organic Compound) fugitive emissions in petroleum refining industry: Background information for proposed standards
[PB83-157743] N83-29885
POLLUTION MONITORING
Summary and results of the comprehensive environmental monitoring program at the INEL's Raft River geothermal site
[DE83-005583] N83-29879
POLYACETYLENE
Electroactive polymers as antistatic materials
[AD-A126102] N83-29400
POLYATOMIC MOLECULES
Kinetic studies of gas phase free radicals
[AD-A125516] N83-29688
POLYCRYSTALS
Silicon material development for terrestrial solar cells. Phase of exploration
[BMFT-FB-T-83-027] N83-29668
POLYIMIDE RESINS
Low temperature cross linking polyimides
[NASA-CASE-LEW-12876-2] N83-29392
POLYIMIDES
Elastomer toughened polyimide adhesives
[NASA-LAR-12775-2] N83-29390
A solvent resistant, thermoplastic aromatic poly(imidesulfone) and process for preparing same
[NASA-CASE-LAR-12858-2] N83-29391
POLYMER CHEMISTRY
Electroactive polymers as antistatic materials
[AD-A126102] N83-29400
POLYMERIZATION
Metal coordination chemistry: Removal and recovery of metal compounds from heavy crude and shale oils with multidentate ligands
[DE83-006912] N83-29343
Synthesis and characterization of a new silicone multiblock polymer
[DE82-015189] N83-29406
POLYMERS
Phase equilibria and transition in mixtures of a homopolymer and a block copolymer. 1: Small-angle X-ray scattering study
[AD-A125818] N83-29396
POLYMORPHISM
Structures and polarized electronic absorption spectra of dimolybdenum tetraformate crystals
[DE83-004863] N83-30281
POLYNOMIALS
Programs for solving polynomial equations
[PB83-167171] N83-30089
POLYNUCLEAR ORGANIC COMPOUNDS
Rapid-screening-luminescence techniques for trace organic analysis
[DE82-017518] N83-29341
POLYURETHANE RESINS
Experimental polyurethane foam roof systems, part 2
[AD-A126315] N83-29453
POLYVINYL ALCOHOL
Polyvinyl alcohol battery separator containing inert filler
[NASA-CASE-LEW-13556-2] N83-29805
POPULATION INVERSION
Infrared radiation and inversion population of CO2 laser levels in Venusian and Martian atmospheres
[NASA-TM-85057] N83-30341
POPULATIONS
Toxicology Information Response Center: A ten-year perspective
[DE82-017430] N83-30005
Selecting representative points in normal populations
[AD-A125770] N83-30149
Solid-liquid contacting in industrial crystalizers and its influence on product size distribution
[WTHD-150] N83-30270
POROSITY
Pyrotechnic deflagration velocity and permeability
[DE82-014100] N83-29428
Energy transport in porous-insulator systems. 2: Performance of vertical enclosures
[DE82-019894] N83-29643
POROUS MATERIALS
Porous polymers as adsorbent for mustard gas
[PML-1981-46] N83-29389
PORPHYRINS
Actionometry in monochromatic flash photolysis: The extinction coefficient of triplet benzophenone and quantum yield of triplet zinc tetraphenyl porphyrin
[DE83-006819] N83-29345
PORTABLE EQUIPMENT
Los Alamos portable beta-ray spectrometer
[DE83-007575] N83-29667
Portable 90 deg proof loading device
[NASA-CASE-MSC-20250-1] N83-29707
Quality of inspections utilizing infrared technology on weatherization retrofit installations
[PB83-146936] N83-30234
POSITION (LOCATION)
Catalogue of 20457 star positions obtained by photography in the declination zone -48 deg to -54 deg (1950)
[AD-A126161] N83-30330
POSITION INDICATORS
Satellite orbit predictor
[NASA-TM-85015] N83-29293
POSITIONING
Manufacturing and cost analyses of heliostats based on the second-generation heliostat-development study
[DE83-006664] N83-29835

POTABLE WATER
Compact flocculation system with sludge and separators and thickeners at the Langenau Waterworks. Development and construction of a high-capacity flocculation system
[BMFT-FB-T-83-037] N83-29459
Degassifying and mixing apparatus for liquids --- potable water for spacecraft
[NASA-CASE-MSC-18936-1] N83-29652

POWDER (PARTICLES)
Silicon carbide alloys
[AD-A125968] N83-29398

POWDER METALLURGY
A fundamental study of tool steels processed from rapidly solidified powders
[AD-A126163] N83-29362

POWER CONDITIONING
Task 4 completion report for 40 Kilowatt grid connected modification contract
[NASA-CR-167950] N83-30297

POWER FACTOR CONTROLLERS
Three phase power factor controller
[NASA-CASE-MFS-25535-2] N83-29593

POWER PLANTS
Applications of composite gas-turbine components, phase 1
[DE83-006574] N83-29718

POWER SPECTRA
Instrument for determining coincidence and elapse time between independent sources of random sequential events
[NASA-CASE-LAR-12531-1] N83-29651

POWER SUPPLIES
An assessment of second-generation compressed-air energy-storage concepts
[DE82-019513] N83-29859

PREBURNERS
Investigation of the feasibility of temperature profiling optical diagnostics in the SSME fuel pre-burner
[NASA-CR-170799] N83-29308

PRECIPITATION (CHEMISTRY)
Characterization of tar products from rapid pyrolysis of bituminous coals
[DE83-007272] N83-29346
Recycling municipal ferrous scrap
[PB83-156968] N83-29384
A solvent resistant, thermoplastic aromatic poly(imidesulfone) and process for preparing same
[NASA-CASE-LAR-12858-2] N83-29391

PRECIPITATION (METEOROLOGY)
Wave propagation in precipitation N83-29496
One-hundred GHz open-resonator measurements of artificial precipitation and fog propagation parameters N83-29522
Acidity, nutrients and minerals in atmospheric precipitation over Florida: Deposition patterns, mechanisms and ecological effects
[PB83-165837] N83-29888

PRECISION
Toward a metrology for precision-machine-tool control systems
[DE82-018077] N83-29458

PRECONDITIONING
A preconditioned formulation of the Cauchy-Riemann equations
[NASA-CR-172156] N83-30107
Preconditioned minimal residual methods for Chebyshev equations
[NASA-CR-172157] N83-30111

PREDICTION ANALYSIS TECHNIQUES
Rain rate profile effects on radiowave attenuation above 10 GHz N83-29520
Uncertainties in estimating worst month statistics for Earth-space links influenced by rain N83-29523
An analytical and numerical comparison between two rain attenuation prediction methods for Earth-satellite paths N83-29524
Prediction of rain attenuation based on point rain rate statistics for Alexandria, Egypt N83-29525
Evaluation of an effective medium temperature from radiometric-satellite beacons comparisons N83-29526
Correlation of 6 and 4 GHz rain-induced depolarization at low elevation angle --- using INTELSAT satellites N83-29529
A contribution to the numerical description of rotating two phase flow --- computer code development, gas-liquid flow
[WTHD-153] N83-29647
Computer simulation of concrete penetration by shaped-charged jets
[DE83-007359] N83-29720
Prediction of hurricane storm surges: A state-of-the-art survey
[PB83-163915] N83-29946
Object detection by two-dimensional linear prediction
[AD-A126340] N83-30128

PREDICTIONS
Microfissuring of Inconel 718
[NASA-TM-82531] N83-29356
Behavior of nine solar-pond candidate salts
[DE83-006029] N83-29830
Mechanical, thermal, and fluid transport properties of rock at depth
[DE82-016008] N83-29912
Earthquakes and earthquake predictions: Simulating their economic effects
[PB83-163725] N83-29939
Formulation of a prototype coupled atmospheric and oceanic boundary layer model
[AD-A126000] N83-29951

PREMIXED FLAMES
Lean limit phenomena N83-29229

PREMIXING
Combustion Fundamentals Research
[NASA-CP-2268] N83-29208
Analytical modeling of operating characteristics of premixing-prevaporizing fuel-air mixing passages N83-29209
Pollutant formation in monodisperse fuel spray combustion N83-29213

PRESSURE DISTRIBUTION
Subsonic panel method for designing wing surfaces from pressure distribution
[NASA-CR-3713] N83-29198
Pressure distributions obtained on a 0.04-scale and 0.02-scale model of the Space Shuttle Orbiter's forward fuselage in the Langley continuous flow hypersonic tunnel
[NASA-TM-84630] N83-29278
Static and seismic lateral pressures on Earth retaining structures, appendices
[PB83-164335] N83-29476

PRESSURE GAGES
Sensing systems for measuring mechanical properties in ground masses. Volume 2: In situ testing with the Menard pressuremeter
[PB83-155952] N83-29792
Sensing systems for measuring mechanical properties in ground masses. Volume 3: Vane shear and cone piezometer
[PB83-155960] N83-29793

PRESSURE GRADIENTS
Adverse pressure gradient corner flows
[AD-A126059] N83-29639
Dual laser optical system and method for studying fluid flow
[NASA-CASE-MFS-25315-1] N83-29680

PRESSURE MEASUREMENT
Amplitude and phase of surface pressure produced by space transportation system: Mission 5
[AD-A125846] N83-29300
Three dimensional modeling of shock initiation of heterogeneous explosives
[DE82-006145] N83-29426
Measurement of pressure-velocity correlations in turbulent reacting flows N83-29628
Dynamic-pressure measurements using an electronically scanned pressure module
[NASA-TM-84650] N83-29655
Non-invasive method and apparatus for measuring pressure within a pliable vessel
[NASA-CASE-ARC-11264-2] N83-29991

PRESSURE SENSORS
Carbon granule probe microphone for leak detection
[NASA-CASE-NPO-16027-1] N83-29595
Selection and calibration of pressure transducers for low pressure measurement (0.001 psia) in the tunnel 9 high altitude side force test (WTR 1365)
[AD-A125475] N83-29657

PRESSURE VESSELS
Securable bearing stress-strain indicator --- for monitoring torque on bolts incorporated in pressure vessels
[NASA-CASE-LAR-12774-1] N83-29654

PRESSURIZED WATER REACTORS
Commercial high-level-waste management: Options and economics. A comparative analysis of the ceramic and glass waste forms
[DE83-006235] N83-30218

PRESSURIZING
Semiconductor measurement technology: Graphical solution for the helium leak detector and radioisotope methods of hermetic test, master graphs and instructions
[PB83-146845] N83-29672

PRETREATMENT
Importance of active sites for char gasification in oxygen (air) and carbon dioxide
[PB83-173393] N83-29445

PREVENTION
Survey and analysis of the heat casualty prevention experiment for Resphiblex 1-81, operation 'Lancer Eagle', 43D, MAU
[AD-A125847] N83-30004

PRIMATES
Mechanical properties of the spinal ligaments of primates. Part 1: Cyclic loading. Part 2: Mathematical modeling
[AD-A125540] N83-29968

PRINTED CIRCUITS
Initial Graphics Exchange Specification (IGES), version 2.0
[PB83-137448] N83-30092

PRINTERS
Federal Automated Data Processing (ADP) equipment: A compilation of statistics, 1981
[PB83-164384] N83-30045

PRISMS
A clinical psychological study of inverted visual field by inversing prisms
[AD-A126220] N83-30010

PROBABILITY DENSITY FUNCTIONS
Monte Carlo modeling in elliptic flows N83-29225
Confidence envelopes for monotonic functions: Principles, derivations, and examples
[AD-A126230] N83-30151

PROBABILITY DISTRIBUTION FUNCTIONS
Measurements of long term radar sea clutter statistics N83-29538
Application of the theory of boundary value problems in the analysis of a queueing modeling with paired services
[MATH-CENTRE-TRACTS-153] N83-30105

PROBABILITY THEORY
Prediction of hurricane storm surges: A state-of-the-art survey
[PB83-163915] N83-29946
Exact probability levels for multisample SMIRNOV-TYPE statistics
[AD-A126104] N83-30152
On the variance of probability estimates with correlated data
[AD-A126336] N83-30153

PROBLEM SOLVING
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172903] N83-30059
Finite-difference, spectral and Galerkin methods for time-dependent problems
[NASA-CR-172149] N83-30110
Multi-gold algorithms with applications to elliptic boundary-value problems
[AD-A125769] N83-30114
High-performance banded and profile equation solvers for the CRAY-1. Part 1: The unsymmetric case
[AD-A125561] N83-30115
Multirate linear multistep methods for the solution of systems of ordinary differential equations
[DE83-004259] N83-30135
Global-error estimation for stiff ODEs
[DE83-006846] N83-30136

PROCEEDINGS
Proceedings of a National Seminar on Energy Challenge of the Eighties
[PB83-164764] N83-29442
Topics in heavy ion reactions
[PB83-164939] N83-30210

PROCESS CONTROL (INDUSTRY)
Industrial burner and process efficiency program
[PB83-161059] N83-29482
Semiconductor technology program progress briefs
[PB83-165043] N83-29675
Multivariable internal model control
[DE83-007320] N83-30101

PROCUREMENT
Department of the Air Force supporting data for fiscal year 1984 budget estimates submitted to Congress, January 31, 1983. Descriptive summaries, research, development, test and evaluation
[AD-A125932] N83-30301

PRODUCT DEVELOPMENT
Design, construction and test of an experimental propeller in the power range 750 HP
[BMFT-FB-W-83-004] N83-29184
External development and production of integrated circuits
[BMFT-FB-T-83-022] N83-29621
Incorporation of high level wastes in SYNROC: Results from recent process engineering studies at Lawrence Livermore National Laboratory
[DE82-013402] N83-30214

PRODUCTION ENGINEERING
Process development for silicon carbide based structural ceramics
[AD-A125857] N83-29399

Glass batch preheater, phase 3
[PB83-167254] N83-29478
PROFILOMETERS
Optical probe for steam-generator-tube dent measurement
[DE83-901484] N83-29668
PROGRAM VERIFICATION (COMPUTERS)
Survey of missile simulation and flight mechanics facilities in NATO
[AGARD-AG-279] N83-29276
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172901] N83-30057
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172902] N83-30058
PROGRAMMING LANGUAGES
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172901] N83-30057
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172902] N83-30058
PRISM: A general purpose programming system
[AD-A126228] N83-30067
PROJECT MANAGEMENT
LANDSAT-4 evaluation program and scientific characterization activities N83-29756
SERI Biomass Program
[DE83-009763] N83-29845
PROJECT PLANNING
Executive committee report: Geotechnical instrumentation working group meeting
[DE82-012837] N83-29664
National severe local storms operations plan
[PB83-163998] N83-29940
PROJECT SETI
Publications of the exobiology program for 1982. A special bibliography
[NASA-TM-85837] N83-30041
PROJECTILES
An inductive-store, pulsed power source
[DE82-015443] N83-30216
PROPELLANTS
Propellant handler's ensemble in-suit noise measurements
[AD-A125507] N83-30040
PROPELLERS
Small transport aircraft technology propeller study
[NASA-CR-166045] N83-29178
Design, construction and test of an experimental propeller in the power range 750 HP
[BMFT-FB-W-83-004] N83-29184
PROPULSION SYSTEM CONFIGURATIONS
An experimental study of a high rotational speed propulsor
[AD-A126060] N83-29238
PROPULSION SYSTEM PERFORMANCE
Deterioration in service of engine transient behaviour N83-29256
Potential benefits of a Full Authority Digital Electronic Control (FADEC) installed on a TF30 engine in an F14 flight test demonstrator aircraft N83-29269
Metal-air battery research and development
[DE82-019681] N83-29864
PROTECTIVE CLOTHING
Fuel fire tests of selected assemblies
[AD-A125820] N83-29450
PROTECTIVE COATINGS
Analysis of refractory fiber insulations and hot face coatings exposed to coal-oil mixture combustion products
[DE82-018210] N83-29321
Reduced-pollution corrosion-protection systems
[PB83-153056] N83-29378
High voltage isolation transformer
[NASA-CASE-GSC-12817-1] N83-29590
PROTEIN SYNTHESIS
Microwaves and human leukocyte function
[AD-A124000] N83-29998
PROTON RESONANCE
Nuclear structure in pion scattering and charge exchange
[DE83-007945] N83-30205
PROTONS
Solar and interplanetary ions near Earth N83-29891
Neutrino oscillations: Present and future experiments
[DE82-903207] N83-30186
PROXIMITY
Commercial scale coal test. Volume 1: Selection of camp 1 coal
[DE83-007436] N83-29435
PSYCHOLOGICAL EFFECTS
Post-flight interview with Berezevoy and Lebedev N83-29261
PSYCHOLOGICAL FACTORS
A clinical psychological study of inverted visual field by inversing prisms
[AD-A126220] N83-30010
PSYCHOLOGICAL TESTS
Components of individual differences in human intelligence
[AD-A125633] N83-30012
PSYCHOLOGY
The effect of environmental change in single-subject experiments
[AD-A125779] N83-30150
Studies of scientific disciplines: An annotated bibliography
[PB83-159954] N83-30319
PSYCHOPHYSIOLOGY
The event related brain potential as an index of information processing, cognitive activity, and skill acquisition: A program of basic research
[AD-A125699] N83-29999
PULSE COMMUNICATION
A fading simulator for frequency selective fading and measurements with a 34 Mbit/s QPSK modem
[FTZ-445-TBR-22] N83-29589
PULSE DURATION
A system for measuring energy and peak power of low-level 1.064 micrometer laser pulses
[PB83-165027] N83-29703
PULSE GENERATORS
A system for measuring energy and peak power of low-level 1.064 micrometer laser pulses
[PB83-165027] N83-29703
PULSE RADAR
Symmetric four antenna array resolves multiple reflectors with complex spectrum analysis of multiplexed closely spaced frequency soundings N83-29555
PULSED LASERS
Start-up of a pulsed beam Free Electron Laser (FEL) oscillator
[AD-A126306] N83-29684
Beam-profile measurement of laser pulses using a spatial filter to sample the hermite modes for a string of pulses
[PB83-156612] N83-29702
Beam-profile measurement of laser pulses using a spatial filter to sample the hermite modes for a string of pulses
[PB83-164996] N83-29705
Laser-fusion (for pedestrians)
[PB83-166470] N83-30265
PULSED RADIATION
An inductive-store, pulsed power source
[DE82-015443] N83-30216
PULSES
Selection of repetition frequencies for laser rangefinders
[AD-A126188] N83-29695
PULTRUSION
Adaptation of pultrusion to the manufacture of helicopter components
[AD-A126291] N83-29171
PUMPS
International survey of the status of technology of critical components for coal-liquefaction processes
[DE82-015236] N83-29339
PURITY
Method for growing low defect, high purity crystalline layers --- photovoltaic cells
[NASA-CASE-NPO-15813-1] N83-30269
PYRITES
Mechanisms and kinetics of coal hydrogenation
[DE82-016296] N83-29331
PYROLYSIS
Diffusion-flame studies of the chemical and physical mechanisms of soot formation from aromatic and substituted-aromatic fuels
[DE83-009093] N83-29334
Actionometry in monochromatic flash photolysis: The extinction coefficient of triplet benzophenone and quantum yield of triplet zinc tetraphenyl porphyrin
[DE83-006819] N83-29345
Characterization of tar products from rapid pyrolysis of bituminous coals
[DE83-007272] N83-29346
Proceedings of the Fifth Fundamental Combustion Research Contractors Workshop
[PB83-164483] N83-29349
Hydropyrolysis of biomass to produce liquid hydrocarbon fuels
[DE83-009985] N83-29420
Importance of active sites for char gasification in oxygen (air) and carbon dioxide
[PB83-173393] N83-29445
PYROMETALLURGY
In-plant recycling of stainless and other specialty steelmaking wastes. Report on investigations, 1982
[PB83-157701] N83-29382
PYROTECHNICS
Pyrotechnic deflagration velocity and permeability
[DE82-014100] N83-29426
Shock sensitivity of the explosive 2-(5-cyanotetrazolato) pentaamine cobalt(3) perchlorate (CP)
[DE82-013837] N83-29429
The characterization and performance of thirteen boron/calcium chromate pyrotechnic blends, 2
[DE82-014693] N83-29430

Q

Q DEVICES
Confinement and heating of high-beta plasmas with emphasis on compact toroids. Task 2: High-beta Q-machine experiment
[DE82-020341] N83-30239
QUALITY CONTROL
Description of STIDAS 2-D. Part 1: General system and program description --- Speech Transmission Index (STI)
[IZF-1982-29-PT-1] N83-29587
Objective acoustic quality inspection by pattern recognition and signal analysis. Design of an inspection system and application to an electric motor
[BMFT-FB-T-83-005] N83-29619
Real-time quality control of SAOs
[PB83-166082] N83-29944
Journal of Research of the National Bureau of Standards, volume 87, number 5, September - October 1982
[PB83-164541] N83-30305
QUANTUM CHROMODYNAMICS
Formation of quark-gluon plasma in nuclear collisions
[DE82-018521] N83-30184
Glueballs: A status report
[DE82-009519] N83-30188
Some prospects for antiproton physics
[DE82-011582] N83-30199
New-particle spectroscopy, quarkonium and gluonic mesons
[DE83-007012] N83-30203
Quark-antiquark bound-state spectroscopy and QCD
[DE83-007062] N83-30204
QUANTUM ELECTRONICS
The generation of near millimeter radiation by picosecond pulse demodulation
[AD-A125510] N83-29576
QUANTUM MECHANICS
A review of quantum Monte Carlo methods and results for Coulombic systems
[DE83-006570] N83-30155
Relations between the simultaneous and sequential transfer of 2 nucleons
[DE82-017425] N83-30190
Particle physics experiments, 1981
[PB83-164715] N83-30207
QUARK PARTON MODEL
Formation of quark-gluon plasma in nuclear collisions
[DE82-018521] N83-30184
Some prospects for antiproton physics
[DE82-011582] N83-30199
New-particle spectroscopy, quarkonium and gluonic mesons
[DE83-007012] N83-30203
Quark-antiquark bound-state spectroscopy and QCD
[DE83-007062] N83-30204
QUARKS
Introduction to the possible substructure of quarks and leptons
[PB83-165605] N83-30211
QUARTZ CRYSTALS
Focusing and imaging sharp line X-ray and gamma-ray sources using variable-metric diffraction crystals
[DE83-007789] N83-30285
QUASARS
First three years of IUE (International Ultraviolet Explorer satellite)
[PB83-166496] N83-30337
QUEUEING THEORY
Application of the theory of boundary value problems in the analysis of a queueing modeling with paired services
[MATH-CENTRE-TRACTS-153] N83-30105
QUINOLINE
Cross-linking reactions of thermally stable high performance polymers
[AD-A125967] N83-29397

R

RABBITS
Influence of prolonged illumination of the rabbit retina by monochromatic light on its functional state N83-29979

RADAR
The generation of near millimeter radiation by picosecond pulse demodulation [AD-A125510] N83-29576

RADAR ANTENNAS
Antenna digital control for the Directed Mirror Antenna Radar (DMAR) [AD-A125812] N83-29585

RADAR CROSS SECTIONS
Helicopter-borne scatterometer [AD-A125796] N83-29561

RADAR ECHOES
Upper tropospheric structures observed with VHF radar at Arecibo N83-29507
Detection criteria for a radar using coincidence processing [AD-A126131] N83-29565

RADAR EQUIPMENT
Helicopter-borne scatterometer [AD-A125796] N83-29561

RADAR GEOLOGY
Application of SEASAT-1 Synthetic Aperture Radar (SAR) data to enhance and detect geological lineaments and to assist LANDSAT landcover classification mapping --- Appalachian Region, West Virginia [E83-10365] N83-29776

RADAR IMAGERY
Stereo side-looking radar experiments [NASA-CR-172905] N83-29489

RADAR REFLECTORS
Antenna digital control for the Directed Mirror Antenna Radar (DMAR) [AD-A125812] N83-29585

RADAR TARGETS
Some signal-processing issues in radar-target identification [DE83-006554] N83-29698

RADIAL DISTRIBUTION
The axisymmetric instability of a self-pinched beam with a rounded radial density profile [AD-A126117] N83-30178

RADIANCE
Thermal band characterization of LANDSAT-4 thematic mapper N83-29761
Thematic mapper intraband radiometric performance N83-29764

RADIANT FLUX DENSITY
Flame radiation measurements N83-29228
A note on beamforming algorithms [AD-A126275] N83-29564

RADIATION
Design analysis and performance evaluation of a two-dimensional camera for accelerated positron-emitter beam injection by computer simulation [DE83-005866] N83-29661
Radiation standards and calibrations [DE82-019748] N83-30200

RADIATION DAMAGE
Theoretical modeling of EMP effects in semiconductor junction devices [AD-A125976] N83-30273

RADIATION DOSAGE
Effect of cordiamine and mesatone on ECG under conditions of acute microwave irradiation N83-29977
Dependence of biological effects of microwave irradiation on exposure intensity and duration N83-29980

RADIATION EFFECTS
Foreign technology alert-bibliography: Ceramics, refractories and glass technology [PB83-101642] N83-29323
USSR report: Life sciences. Effects of nonionizing electromagnetic radiation, no. 10 [JPRS-83745] N83-29973
Autoallergic effects of microwave electromagnetic energy and their influence on the fetus and offspring N83-29974
Problems of studying the biological effect of electromagnetic fields discussed N83-29976
Effect of cordiamine and mesatone on ECG under conditions of acute microwave irradiation N83-29977
A theoretical analysis of the observed calcium anomalies concomitant with the interaction of low intensity electric fields with cerebral tissue [AD-A126284] N83-29996

RADIATION HARDENING
Design-dependent variability of pulse hardness of types of discrete semiconductor devices (intervendor variations) [AD-A125776] N83-29560
Rapid annealing in advanced bipolar microcircuits [DE82-018772] N83-29616

RADIATION MEASUREMENT
An investigation of the basic characteristics of the radiation of straight xenon flash tubes [DE82-016680] N83-29614

RADIATION TRANSPORT
SENSIT-2D: A two-dimensional cross-section sensitivity-and uncertainty-analysis code [DE83-004479] N83-30083

RADIATIVE RECOMBINATION
Theory of reactions at a solid surface [AD-A126202] N83-29697

RADIATIVE TRANSFER
Radiative transfer in size-limited bodies --- rain attenuation N83-29544
Multiple scattering effects in aerosols: Theoretical investigations [AD-A125480] N83-29693
In-progress absolute radiometric inflight calibration of the LANDSAT-4 sensors N83-29763
Remote sensing of surface propagation parameters: Application of imagery simulation model results [AD-A125513] N83-29785
Modelling of the 10-micrometer natural laser emission from the mesospheres of Mars and Venus [NASA-TM-85045] N83-30342
Single and multiple scattered solar radiation [AD-A126323] N83-30349

RADICALS
High-resolution laser and rf spectroscopy of atomic and molecular beams [DE83-008942] N83-29699

RADIO ALTIMETERS
Comparison of two methods for estimating the water vapor correction to altimeter readings from radiometric measurements N83-29541
Propagation characteristics at 35 and 78 GHz for spaceborne altimeters N83-29546
East Antarctic ice sheet surface contours from satellite radar altimetry, a demonstration [PB83-166397] N83-29796

RADIO ATTENUATION
Uncertainties in estimating worst month statistics for Earth-space links influenced by rain N83-29523
An analytical and numerical comparison between two rain attenuation prediction methods for Earth-satellite paths N83-29524
Prediction of rain attenuation based on point rain rate statistics for Alexandria, Egypt N83-29525
Evaluation of an effective medium temperature from radiometric-satellite beacons comparisons N83-29526
Propagation characteristics at 35 and 78 GHz for spaceborne altimeters N83-29546
The dependency on the propagation environment of the frequency scaling of attenuation N83-29550
Radar modeling of space diversity associated with slant path rain attenuation at variable path angles, frequencies, and drop size distributions N83-29551
Site diversity in Earth to satellite links: Radar measurements and theoretical predictions N83-29552
Attenuation of radio waves by atmospheric wet ice and mixed phased hydrometeors N83-29553
Assessment of the intrinsic rain profile parameters from radar and raingauge data --- rain intensity, shape index, rainy path length N83-29554

RADIO BEACONS
Satellite orbit predictor [NASA-TM-85015] N83-29293

RADIO COMMUNICATION
ELF (Extremely Low Frequency) PVS (Propagation Validation System) field strength measurements, January and February, 1978 [AD-A126208] N83-29577

RADIO FREQUENCIES
Relativistic two-dimensional theory of RF current drive [DE83-010250] N83-29613
Theory of current drive with lower hybrid waves [DE82-017216] N83-30243

RADIO FREQUENCY HEATING
Infrared detection of microwave induced surface currents on flat plates [AD-A126207] N83-30227

RADIO NAVIGATION
Navigation: National plans; NAVSTAR-GPS; Laser gyros [AD-A125533] N83-29194

RADIO RECEPTION
Distortions in FM car radios caused by multipath reception and their reduction by means of antenna diversity N83-29502
ELF PVS field strength measurements, April 1977 [AD-A126212] N83-29574

RADIO RELAY SYSTEMS
A fading simulator for frequency selective fading and measurements with a 34 Mbit/s QPSK modem [FTZ-445-TBR-22] N83-29589

RADIO WAVES
A comparison of radio waye and in situ observations of tropospheric turbulence and wind velocity N83-29506
High-resolution laser and rf spectroscopy of atomic and molecular beams [DE83-008942] N83-29699

RADIOACTIVE AGE DETERMINATION
Accelerator mass spectrometry: From nuclear physics to dating [DE83-007863] N83-29342

RADIOACTIVE DECAY
Gamma decay of unbound states following neutron capture [DE82-017305] N83-30191

RADIOACTIVE ISOTOPES
Calculation of unsaturated hydraulic conductivity [DE82-016325] N83-29876

RADIOACTIVE WASTES
Executive committee report: Geotechnical instrumentation working group meeting [DE82-012837] N83-29664
Calculation of unsaturated hydraulic conductivity [DE82-016325] N83-29876
Remote-reference magnetotelluric survey, Nevada test site and vicinity, Nevada and California [DE82-019412] N83-29909
Incorporation of high level wastes in SYNROC: Results from recent process engineering studies at Lawrence Livermore National Laboratory [DE82-013402] N83-30214
Hanford solid-waste handling facility strategy [DE82-017163] N83-30215
Analysis, scale modeling, and full-scale tests of low-level nuclear-waste-drum response to accident environments [DE83-007587] N83-30217
Commercial high-level-waste management: Options and economics. A comparative analysis of the ceramic and glass waste forms [DE83-006235] N83-30218
A process for locating shallow land-burial sites for low level radioactive waste [DE83-008173] N83-30219

RADIOMETERS
Attenuation by rain on Earth-space paths at 13 GHz N83-29512

RADIOMETRIC CORRECTION
Comparison of two methods for estimating the water vapor correction to altimeter readings from radiometric measurements N83-29541
Thematic mapper intraband radiometric performance N83-29764

RADIOMETRIC RESOLUTION
Effects of the atmosphere on image resolution in microwave radiometry N83-29530
LANDSAT-4 Scientific Characterization: Early Results Symposium [E83-10356] N83-29754
TM report N83-29757
Investigation of radiometric properties of LANDSAT-4 MSS N83-29758
Impact of LANDSAT MSS sensor differences on change detection analysis N83-29759
Thermal band characterization of LANDSAT-4 thematic mapper N83-29761
Evaluation of the radiometric quality of the TM data using clustering and multispectral distance measures N83-29762
In-progress absolute radiometric inflight calibration of the LANDSAT-4 sensors N83-29763
Thematic mapper intraband radiometric performance N83-29764
An evaluation of LANDSAT-4 thematic mapper data for their geometric and radiometric accuracies and their relevance to geologic mapping N83-29765

RADIOSONDES
Accuracy, reproducibility and vertical resolution of data from radiosondes [NASA-TM-76949] N83-29925

RAIN
Propagation effects handbook for satellite systems design. A summary of propagation impairments on 10 to 100 GHz satellite links with techniques for system design [NASA-RP-1082(03)] N83-29491
Wave propagation and remote sensing --- conferences [ESA-SP-194] N83-29494
Attenuation by rain on Earth-space paths at 13 GHz N83-29512

Rain rate profile effects on radiowave attenuation above 10 GHz N83-29520
Statistics on the fine scale structure of rain in Stockholm, 1977-1979 N83-29521
Uncertainties in estimating worst month statistics for Earth-space links influenced by rain N83-29523
An analytical and numerical comparison between two rain attenuation prediction methods for Earth-satellite paths N83-29524
Prediction of rain attenuation based on point rain rate statistics for Alexandria, Egypt N83-29525
Influence of raindrop oscillations on coherent forward scattering of microwaves in rain N83-29528
Correlation of 6 and 4 GHz rain-induced depolarization at low elevation angle --- using INTELSAT satellites N83-29529
Radiative transfer in size-limited bodies --- rain attenuation N83-29544
The dependency on the propagation environment of the frequency scaling of attenuation N83-29550
Site diversity in Earth to satellite links: Radar measurements and theoretical predictions N83-29552
Assessment of the intrinsic rain profile parameters from radar and raingauge data --- rain intensity, shape index, rainy path length N83-29554
Scattering by spheroidal and rough particles [AD-A125767] N83-29558
MORECS (Metrological Office Rainfall and Evaporation Calculation Scheme) discussion meeting, April 1981 [PB83-163212] N83-29798

RAIN GAGES
Assessment of the intrinsic rain profile parameters from radar and raingauge data --- rain intensity, shape index, rainy path length N83-29554

RAINDROPS
Measurements and analysis of raindrop size distribution in south western Nigeria N83-29518
Theoretical and experimental investigation of propagation attenuation by equatorial and tropical precipitation N83-29519
Influence of raindrop oscillations on coherent forward scattering of microwaves in rain N83-29528
Radar modeling of space diversity associated with slant path rain attenuation at variable path angles, frequencies, and drop size distributions N83-29551

RAMAN LASERS
Third order polarization for multifrequency coherent anti-Stokes Raman scattering [AD-A125434] N83-29330

RAMAN SPECTRA
Wavelength scaling of the two-plasmon decay and stimulated Raman-scattering instabilities [DE83-007905] N83-30202

RANDOM ACCESS MEMORY
Memory-based parallel data output controller [NASA-CASE-GSC-12447-2] N83-29302

RANDOM NOISE
On sequential detection in dependent noise [AD-A125836] N83-29600

RANDOM NUMBERS
Projections of lawless sequences [MATH-CENTRE-TRACTS-152] N83-30104

RANDOM VARIABLES
Application of advanced reliability methods to local strain fatigue analysis [NASA-CR-168198] N83-29734
Selecting representative points in normal populations [AD-A125770] N83-30149
Exact probability levels for multisample SMIRNOV-TYPE statistics [AD-A126104] N83-30152

RANDOM WALK
Numerical modeling of turbulent combustion N83-29233
Moments of the minimum of a random walk and complete convergence [AD-A125768] N83-30148

RAPID TRANSIT SYSTEMS
Noise test-resilient wheels Massachusetts Bay Transportation Authority green line [PB83-148635] N83-30329

RARE EARTH ALLOYS
Magnetization of rare earth/cobalt permanent magnets subsequent to assembly in complex rotor structures [AD-A126322] N83-30163

RARE GAS-HALIDE LASERS
Microwave conditioned dc discharges for excitation of rare-gas-halide lasers [AD-A126222] N83-29694

RATS
Effect of industrial frequency electric field (50 Hz) on metabolism of copper, iron and metalloenzymes bound to them (experimental research) N83-29985

RAY TRACING
Versatile three-dimensional Hamiltonian ray-tracing computer program for acoustic waves in the atmosphere [PB83-149930] N83-30170

REACTION KINETICS
Combustion Fundamentals Research [NASA-CP-2268] N83-29208
Mechanisms and kinetics of coal hydrogenation [DE82-016296] N83-29331
CO + H sub 2 reactions over nitrogen-modified iron catalysts [DE83-006579] N83-29335
Recovery of hydrogen from hydrogen sulfide: Bench scale studies of the reaction of hydrogen sulfide with liquid copper [DE83-005947] N83-29336
Actionometry in monochromatic flash photolysis: The extinction coefficient of triplet benzophenone and quantum yield of triplet zinc tetraphenyl porphyrin [DE83-006819] N83-29345
Proceedings of the Fifth Fundamental Combustion Research Contractors Workshop [PB83-164483] N83-29349
Kinetics of the thermal decomposition of solid PETN [DE82-004368] N83-29425
Theory of reactions at a solid surface [AD-A126202] N83-29697
Hydrodynamic/kinetic reactions in liquid-dominated geothermal systems [DE82-017287] N83-29814
Cloudwater acidity measurements and formation mechanisms: Experimental design [DE83-005911] N83-29874
Molecular beam chemistry: Reactions of oxygen atoms with halogen molecules [AD-A125870] N83-30175

REACTION PRODUCTS
Mechanisms and kinetics of coal hydrogenation [DE82-016296] N83-29331

REACTION TIME
A fundamental study of tool steels processed from rapidly solidified powders [AD-A126163] N83-29362

REACTOR CORES
An elementary approach to the six-port reflectometer, its theory and implementation [DE82-015514] N83-30233

REACTOR DESIGN
Preliminary conceptual design study of a suppressed-fission Tokamak hybrid [DE83-008428] N83-30255

REACTOR PHYSICS
Synfuel from fusion: Using the tandem mirror reactor and a thermochemical cycle to produce hydrogen [DE83-005216] N83-29424

REACTOR SAFETY
Development and qualification of computer-aided assessment (CAS) [AD-A125477] N83-30078

REACTOR TECHNOLOGY
Neutrino oscillations: Present and future experiments [DE82-903207] N83-30186
Physical and engineering constraints for Tokamak reactors and helical coils [DE82-019251] N83-30247
A Workshop on Alternative Fusion Concepts and Their Utilization Projections [PB83-157966] N83-30263

READ-ONLY MEMORY DEVICES
FDAS EPROM programming manual [DE82-019229] N83-30085

REAL TIME OPERATION
Design of a high-speed digital processing element for parallel simulation [NASA-TM-83373] N83-29597

RECEIVERS
The 10-MWe central-receiver solar-thermal pilot-plant test operation plan [DE83-009737] N83-29843

RECORDS
Mean monthly, seasonal and annual pan evaporation for the United States [PB83-161729] N83-29942

RECOVERABILITY
Designing for stability in advanced turbine engines N83-29266

RECURSIVE FUNCTIONS
A recursive estimator and stability of a class of time varying difference equations [PB83-167213] N83-30136
Survey of some results from the theory of stochastic approximations with a view to system identification [PB83-161943] N83-30142

RECYCLING
In-plant recycling of stainless and other specialty steelmaking wastes. Report on investigations, 1982 [PB83-157701] N83-29382
Recycling municipal ferrous scrap [PB83-156968] N83-29384
Current concepts of the CELSS program N83-30017

REDOX CELLS
An electrochemical rebalance cell for Redox systems [NASA-TM-83363] N83-29326
NASA Redox Project status summary [NASA-TM-83401] N83-29810
Flowing-electrolyte-battery testing and evaluation [DE82-015258] N83-29861

REDUCED GRAVITY
Vibration measurement and attenuation for Spacelab experiments of the D1 mission [BMFT-FB-W-83-003] N83-29301
Time-dependent convection --- in microgravity [BMFT-FB-W-83-001] N83-29648

REFERENCE ATMOSPHERES
Cape Canaveral, Florida range reference atmosphere 0-70 km altitude [NASA-TM-85253] N83-29935

REFERENCE SYSTEMS
The influence of reference system disparity on navigation and positioning [AD-A125546] N83-29195
Reference marker: Photopoint resources management system [PB83-163345] N83-29467

REFINING
Silicon material development for terrestrial solar cells. Phase of exploration [BMFT-FB-T-83-027] N83-29868
VOC (Volatile Organic Compound) fugitive emissions in petroleum refining industry: Background information for proposed standards [PB83-157743] N83-29885
Environmental assessment data base for petroleum refining wastewaters and residuals [PB83-164749] N83-30316

REFLECTANCE
Remote sensing of surface propagation parameters: Application of imagery simulation model results [AD-A125513] N83-29785

REFLECTED WAVES
X-ray imaging mirror system and method of producing the same [NASA-CASE-NPO-15828-1] N83-30222

REFLECTOMETERS
An elementary approach to the six-port reflectometer, its theory and implementation [DE82-015514] N83-30233

REFRACTIVITY
Measurements of radio refractive index profiles in tropical and equatorial regions and their influence on line of sight microwave links N83-29503
Statistics of radio refractivity and atmospheric attenuation in tropical climates --- Africa N83-29505
An offsetting technique to study oscillations in direction of arrival in Earth-space paths N83-29509
Measurements of the complex refractive index of soils and airborne particles N83-29515
Capability of surface-based clear-air Doppler radar for monitoring meteorological properties in elevated layers N83-29549
Experimental and analytical aspects of atmospheric EHF refractivity N83-29556
Effect of large-scale anisotropic refractive index inhomogeneities on the strength of the coherent VHF signal component beyond the horizon N83-29557
Dual laser optical system and method for studying fluid flow [NASA-CASE-MFS-25315-1] N83-29680
X-ray imaging mirror system and method of producing the same [NASA-CASE-NPO-15828-1] N83-30222

REFRACTORY MATERIALS
Analysis of refractory fiber insulations and hot face coatings exposed to coal-oil mixture combustion products [DE82-018210] N83-29321
The development of refractory metallization for high-speed VISI circuits [AD-A125783] N83-29598

REFRIGERATING
Magnetic heat pumping [NASA-CASE-LEW-12508-3] N83-29625

REFUELING
Operating experience with a liquid-hydrogen fueled Buick and refueling system [DE82-008113] N83-29716

REGENERATION (ENGINEERING)
The CELSS program: An overview of its structure and use of computer modelling N83-30018

REGENERATORS
Magnetic heat pumping
[NASA-CASE-LEW-12508-3] N83-29625
REGIONAL PLANNING
Remote sensing program
[E83-10304] N83-29745
REGRESSION ANALYSIS
Measurements and analysis of raindrop size distribution in south western Nigeria N83-29518
Assessment of the geothermal resources of Kansas. Volume 2, section 2: Appendices
[DE83-003221] N83-29786
Non-linear regression
[PB83-167643] N83-30146
Confidence envelopes for monotonic functions: Principles, derivations, and examples
[AD-A126230] N83-30151
REGULATIONS
US Synthetic Fuels Corporation and National Synfuels Policy
[GPO-96-481] N83-29413
Report of the 67th National Conference on Weights and Measures 1982
[PB83-167148] N83-29473
Radiation standards and calibrations
[DE82-019748] N83-30200
REINFORCED PLASTICS
Plastics in the 80's
[PB83-163311] N83-29409
REINFORCEMENT (STRUCTURES)
Behavior and design of reinforced concrete column-type lapped splices subjected to high-intensity cyclic loading
[PB83-165134] N83-29474
REINFORCING FIBERS
Plastics in the 80's
[PB83-163311] N83-29409
RELATIVISTIC ELECTRON BEAMS
High-power generation of microwave and infrared radiation
[AD-A125953] N83-30161
Diagnostics development for E-beam excited air channels. Conductivity measurements in air afterglows
[AD-A125997] N83-30174
Topics in plasma instabilities: Trapped-particle modes and MHD
[DE82-019194] N83-30253
Ion acceleration in the plasma focus
[IPF-82-6] N83-30257
RELATIVITY
Hadronic Press monographs in theoretical physics, no. 2. Admissible approach to the hadronic structure. Volume 2: Covering of the Galilei and Einstein relavities?
[DE83-007251] N83-30160
RELAXATION METHOD (MATHEMATICS)
Self organization phenomena in the plasma focus
[IPF-82-9] N83-30259
RELEASING
Water release from heated concretes
[DE82-015196] N83-29457
RELIABILITY
Mechanical reliability of current alumina and beryllia ceramics used in microwave windows for gyrotrons
[DE83-006360] N83-29404
Compatability and accelerated aging study for Li(Si)FeS2 thermally activated batteries
[DE82-009026] N83-29817
Specifying reliability as a software attribute
[AD-A125934] N83-30075
An O(/E/) time algorithm for computing the reliability of a class of directed networks
[PB83-167197] N83-30159
RELIABILITY ANALYSIS
Transducer reliability in engineering research and development --- jet engine tests
[PNR-90147] N83-29669
Statistical summaries of fatigue data for design purposes
[NASA-CR-3697] N83-29731
Application of advanced reliability methods to local strain fatigue analysis
[NASA-CR-168198] N83-29734
Development and qualification of computer-aided assessment (CAS)
[AD-A125477] N83-30078
RELIABILITY ENGINEERING
Development of software fault-tolerance techniques
[NASA-CR-172122] N83-30052
REMOTE CONSOLES
Data highway terminal controller
[NASA-TM-77241] N83-30042
REMOTE CONTROL
Remote control of on-board satellite systems N83-29285
REMOTE SENSING
Variable acuity remote viewing system flight demonstration
[NASA-CR-170404] N83-29204
Wave propagation and remote sensing --- conferences
[ESA-SP-194] N83-29494
Wave propagation and remote sensing N83-29495
A comparison of radio wave and in situ observations of tropospheric turbulence and wind velocity N83-29506
Radiometric sensing of the atmospheric boundary layer N83-29533
ART and SIRT correction factors in geotomography --- algebraic reconstruction technique (ART); simultaneous iterative reconstruction technique (SIRT) N83-29539
Stability improvements in geotomographic inversion methods N83-29540
On the use of communication concepts and techniques for remote sensing N83-29545
On electromagnetic methods in geophysical probing N83-29547
Remote sensing of surface propagation parameters: Application of imagery simulation model results
[AD-A125513] N83-29785
Remote-reference magnetotelluric survey, Nevada test site and vicinity, Nevada and California
[DE82-019412] N83-29909
Research in space commercialization, technology transfer and communications
[NASA-CR-172887] N83-30327
REMOTE SENSORS
Heterodyne detector/electronics design and alignment of a pulsed CO2 laser wind system
[AD-A126264] N83-29682
REMOTELY PILOTED VEHICLES
Wind-tunnel investigation of aerodynamic loading on a 0.237-scale model of a remotely piloted research vehicle with a thick, high-aspect-ratio supercritical wing
[NASA-TM-84614] N83-29176
REMOVAL
DARCOM metal removal working group
[AD-A126054] N83-29451
REPETITION
Selection of repetition frequencies for laser rangefinders
[AD-A126188] N83-29695
RESCUE OPERATIONS
Further development of Kospas-Salyut system N83-29287
RESEARCH AND DEVELOPMENT
Considerations of technology transfer barriers in the modification of strategic superalloys for aircraft turbine engines
[NASA-TM-83395] N83-29360
External development and production of integrated circuits
[BMFT-FB-T-83-022] N83-29621
RESEARCH FACILITIES
Experimental aerodynamic facilities of the Aerodynamics Research and Concepts Assistance Section
[AD-A126272] N83-29274
AFRPL technical objective document FY 84
[AD-A125495] N83-29309
Oversight of Department of Energy research and development facilities
[GPO-99-908] N83-29807
RESEARCH MANAGEMENT
Joint Services Electronics Program, Stanford University
[AD-A126140] N83-29602
Oversight of Department of Energy research and development facilities
[GPO-99-908] N83-29807
Seismological discrimination and yield determination research
[AD-A126002] N83-29896
Rand data base of Soviet high-current particle-beam R&D
[AD-A125536] N83-30181
Department of the Air Force supporting data for fiscal year 1984 budget estimates submitted to Congress, January 31, 1983. Descriptive summaries, research, development, test and evaluation
[AD-A125932] N83-30301
Department of Defense in-house RDT and E (Research Development Test and Evaluation) activities
[AD-A125498] N83-30302
RESERVES
Demonstrated reserve base of coal in the United States on 1 January 1980
[DE83-006471] N83-29789
RESIDENTIAL ENERGY
Solar assisted gas-fired absorption heat pump
[PB83-167502] N83-29477
Assessment of residential passive solar/gas-fired energy systems
[PB83-167239] N83-29479
Pulse combustion residential water heater
[PB83-167221] N83-29480
Residential demand for energy. Volume 1: Residential energy demand in the US
[DE82-903277] N83-29818
Evaluation of the ORNL residential energy-use model
[DE82-905768] N83-29820
Establishment and furnishing of the Photovoltaic Center for the Southwest Residential Experiment Station
[DE82-904018] N83-29825
Performance of Living History Farm's salt-gradient solar pond
[DE83-009066] N83-29839
Solar energy system performance evaluation. Crown Realty 1, Lakewood, Colorado, December 1981 through March 1982
[DE82-019029] N83-29855
RESIDUAL STRESS
Changes in residual stress, domain size and microstrain during fatigue of 1008 steel
[AD-A126058] N83-29364
RESIN MATRIX COMPOSITES
Use of composites in aero-engines
[PNR-90149] N83-29322
RESISTANCE HEATING
Relativistic two-dimensional theory of RF current drive
[DE83-010250] N83-29613
RESOLUTION
LANDSAT-4 evaluation program and scientific characterization activities N83-29756
Accuracy, reproducibility and vertical resolution of data from radiosondes
[NASA-TM-76949] N83-29925
RESONANCE
Tests of a resonance detector spectrometer for electron-volt spectroscopy
[DE83-007611] N83-29666
Analytical nonsingular theory for geopotential perturbations including resonance effects
[DFVLR-FB-82-28] N83-29915
RESONANT FREQUENCIES
Active tuning of rf cavities
[DE83-007126] N83-29586
RESOURCES MANAGEMENT
The 1980 land cover for the Puget Sound region
[E83-10360] N83-29771
RESPIRATION
NBS portable ambient particulate sampler
[PB83-165019] N83-29679
Effect of low-intensity superhigh-frequency energy on respiration and oxidative phosphorylation of organ mitochondria and activity of some blood enzymes N83-29975
CO2 retention and ECG changes in exercise during prolonged hyperbaric N2-O2 breathing
[AD-A125403] N83-30002
RETINA
Influence of prolonged illumination of the rabbit retina by monochromatic light on its functional state N83-29979
RETRACTABLE EQUIPMENT
Extended moment arm anti-spin device
[NASA-CASE-LAR-12979-1] N83-29173
Satellite retrieval system
[NASA-CASE-MFS-25403-1] N83-29303
REVERSE FIELD PINCH
Confinement and heating of high-beta plasmas with emphasis on compact toroids. Task 2: High-beta Q-machine experiment
[DE82-020341] N83-30239
Statistical magnetohydrodynamics and reversed-field-pinch quiescence
[DE82-015740] N83-30246
Topics in plasma instabilities: Trapped-particle modes and MHD
[DE82-019194] N83-30253
Self organization phenomena in the plasma focus
[IPF-82-9] N83-30259
REVERSE OSMOSIS
Countercurrent reverse osmosis for ethanol-water separation
[DE83-009725] N83-29333
Membrane separations in chemical processing
[PB83-165068] N83-29355
REVERSED FLOW
Dilution jet experiments in compact combustor configurations N83-29218
REYNOLDS NUMBER
Modeling of fluctuating mass flux in variable density flows N83-29224
Large-scale separation and wake closure/reattachment. The cascade problem
[UTRC83-13] N83-29629

RICCATI EQUATION
Time scales, coherency, and weak coupling
[AD-A125845] N83-30118
RING LASERS
Navigation: National plans; NAVSTAR-GPS; Laser gyros
[AD-A125533] N83-29194
RING STRUCTURES
Full-scale turbine-missile-casing tests
[DE83-007427] N83-29310
RISK
A perspective on the role of microcosms in environmental fate and effects assessments
[PB83-165530] N83-29889
Towards a prescriptive organization theory of decision aiding for risk management. Phase 1: Conceptual development
[PB83-156109] N83-30304
RIT ENGINES
Studies about alternative propellants for ion propulsion systems N83-29436
ROADS
Comparison of road load simulator test results with track tests on electric vehicle propulsion system
[NASA-TM-83393] N83-29811
ROASTING
Process for producing oxygen
[DE83-006648] N83-29344
Incorporation of high level wastes in SYNROC: Results from recent process engineering studies at Lawrence Livermore National Laboratory
[DE82-013402] N83-30214
ROBOTS
Robots on Venus N83-29283
European Scientific Notes, Volume 36, Number 12
[AD-A126057] N83-30353
ROBUSTNESS (MATHEMATICS)
Topics in robust statistical signal processing
[AD-A125931] N83-30126
ROCK MECHANICS
Sensing systems for measuring mechanical properties in ground masses. Volume 2: In situ testing with the Menard pressuremeter
[PB83-155952] N83-29792
ROCKET ENGINES
The evaluation of the rolling moments induced by wraparound fins
[NASA-TM-84381] N83-29180
ROCKS
An evaluation of LANDSAT-4 thematic mapper data for their geometric and radiometric accuracies and their relevance to geologic mapping N83-29765
Cross-borehole fracture mapping using electromagnetic geotomography
[DE82-012609] N83-29910
Mechanical, thermal, and fluid transport properties of rock at depth
[DE82-016008] N83-29912
Application of NURE data to the study of crystalline rocks in the Wyoming uranium province
[DE83-008323] N83-29914
Roede formation: Early old red sandstone facies in the Silurian of Jaemtland Sweden
[PB83-165621] N83-29917
Analysis of the internal point load test
[PB83-164566] N83-29919
ROLLER BEARINGS
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172906] N83-30054
ROLLING MOMENTS
The evaluation of the rolling moments induced by wraparound fins
[NASA-TM-84381] N83-29180
ROOFS
Experimental polyurethane foam roof systems, part 2
[AD-A126315] N83-29453
Analysis of roof snow load case studies: Uniform loads
[AD-A126330] N83-29455
ROTARY WING AIRCRAFT
A survey of serious aircraft accidents involving fatigue fracture. Volume 2: Rotary-wing aircraft
[NAE-AN-8] N83-29188
Development of rotorcraft interior. Noise control concepts. Phase 1: Definition study
[NASA-CR-166101] N83-30166
ROTATING BODIES
Vibration in planetary gear systems with unequal planet stiffnesses
[NASA-TM-83428] N83-29709
ROTATING CYLINDERS
Flow in a partially filled rotating cylinder N83-29626
Flow in a partially filled rotating cylinder --- as applied to gas centrifuges utilized for isotope separation
[DE82-018309] N83-29644
ROTATING FLUIDS
A contribution to the numerical description of rotating two phase flow --- computer code development, gas-liquid flow
[WTHD-153] N83-29647
ROTATING STALLS
A theory of rotating stall of multistage axial compressors
[NASA-CR-3685] N83-29175
ROTATION
An experimental study of a high rotational speed propulsor
[AD-A126060] N83-29238
High-resolution laser and rf spectroscopy of atomic and molecular beams
[DE83-008942] N83-29699
ROTOR BLADES (TURBOMACHINERY)
Models for predicting tip clearance changes in gas turbines N83-29255
ROTORS
Rotor fragment protection program: Statistics on aircraft gas turbine engine rotor failures that occurred in US commercial aviation during 1979
[NASA-CR-168163] N83-29234
Magnetization of rare earth/cobalt permanent magnets subsequent to assembly in complex rotor structures
[AD-A126322] N83-30163
ROUGHNESS
Remote sensing of surface propagation parameters: Application of imagery simulation model results
[AD-A125513] N83-29785
ROUTES
A minimal technology routing system
[AD-A126079] N83-30122
RUBBER
Elastomer toughened polyimide adhesives
[NASA-LAR-12775-2] N83-29390
Elastomeric bearings design, construction and materials
[PB83-149211] N83-29723
RUBIDIUM
Phase 2B prototype redesign, tactical rubidium frequency standard
[AD-A126320] N83-29658
RUNWAY CONDITIONS
Large airplane operations on contaminated runways
[PB83-917003] N83-29189
RURAL AREAS
The bush pilot syndrome: A critical incident analysis N83-30008
RYDBERG SERIES
Photoionization research on atomic radiation. 3: The ionization cross section of atomic nitrogen
[NASA-TM-77107] N83-30172

S

S MATRIX THEORY
The S-matrix and acoustic signal structure in simple and compound waveguides
[AD-A125583] N83-30129
S-N DIAGRAMS
Statistical summaries of fatigue data for design purposes
[NASA-CR-3697] N83-29731
S-2 AIRCRAFT
Measurements of airtanker drop conditions during firefighting operations
[PB83-157883] N83-29203
SADDLE POINTS
A saddle value characterization of Fan's equilibrium points
[AD-A126237] N83-30120
SAFETY
Field environmental evaluation plan for sulfur use in pavements
[PB83-156687] N83-29461
SAFETY FACTORS
Transco medium-Btu coal gasification project. Executive summary
[DE82-009598] N83-29418
SALINITY
The long term upper ocean study (LOTUS) cruise summary and hydrographic data report OCEANUS 119, May 1982
[AD-A125737] N83-29956
Vertical sections of temperature, salinity, thermosteric anomaly, and zonal geostrophic velocity from Norpax shuttle experiment, part 3
[PB83-169961] N83-29960
SALTS
Behavior of nine solar-pond candidate salts
[DE83-006029] N83-29830
SALYUT SPACE STATION
Dynamics of ocean and atmosphere on basis of observations from Salyut-6 N83-29286
SAMPLING
Exact probability levels for multisample SMIRNOV-TYPE statistics
[AD-A126104] N83-30152
SANDS
Measurements of the complex refractive index of soils and airborne particles N83-29515
Effects of dust/sandstorm on some aspects of microwave propagation N83-29516
SARSAT
Further development of Kospas-Salyut system N83-29287
Satellite orbit predictor
[NASA-TM-85015] N83-29293
SATELLITE ANTENNAS
On the aperture illumination of multibeam satellite antennas
[FTZ-454-TBR-36] N83-29588
SATELLITE ATMOSPHERES
Io escape and ionization of atmospheric gases
[NASA-CR-172685] N83-30336
SATELLITE CONTROL
Remote control of on-board satellite systems N83-29285
SATELLITE IMAGERY
SEASAT synthetic-aperture radar data user's manual
[E83-10321] N83-29746
LANDSAT imagery: Description of products available from the CSIR Satellite Remote Sensing Centre
[E83-10354] N83-29752
SATELLITE OBSERVATION
USSR report: Space, No. 22
[JPRS-83612] N83-29280
Optical orientation in space N83-29282
Satellite observation of Great Lakes ice: 1980-81
[PB83-156877] N83-29795
SATELLITE ORBITS
Satellite orbit predictor
[NASA-TM-85015] N83-29293
SATELLITE TRANSMISSION
Attenuation by rain on Earth-space paths at 13 GHz N83-29512
Effects of dust/sandstorm on some aspects of microwave propagation N83-29516
Uncertainties in estimating worst month statistics for Earth-space links influenced by rain N83-29523
An analytical and numerical comparison between two rain attenuation prediction methods for Earth-satellite paths N83-29524
SATELLITE-BORNE INSTRUMENTS
Propagation characteristics at 35 and 78 GHz for spaceborne altimeters N83-29546
SATURN (PLANET)
Currents in Saturn's magnetosphere
[NASA-TM-85055] N83-30345
Structure and dynamics of Saturn's outer magnetosphere and boundary regions
[NASA-TM-85065] N83-30346
SCALARS
Higgs mass scales and matter-anti-matter oscillations in grand unified theories
[DE82-017638] N83-30294
SCALING LAWS
Automatic scaling of digisonde ionograms test and evaluation report
[AD-A125830] N83-30084
Singular perturbations and time-scale methods in control theory: Survey 1976-1982
[AD-A125908] N83-30100
SCATTERING AMPLITUDE
Third order polarization for multifrequency coherent anti-Stokes Raman scattering
[AD-A125434] N83-29330
SCATTERING CROSS SECTIONS
Circular differential scattering is an important part of the circular dichroism of macromolecules
[DE83-007022] N83-29405
SCATTERING FUNCTIONS
A new perturbation expansion for electromagnetic scattering by stochastic surfaces N83-29536
SCATTEROMETERS
Helicopter-borne scatterometer
[AD-A125796] N83-29561
SCENE ANALYSIS
Impact of LANDSAT MSS sensor differences on change detection analysis N83-29759
SCHOTTKY DIODES
GaAs Schottky barrier photo-responsive device and method of fabrication --- photovoltaic cells
[NASA-CASE-GSC-12816-1] N83-30268

SCHROEDINGER EQUATION
Non-self-adjoint inverse spectral theoretic derivation of a complex von Nuemann-Wigner potential
[DE83-009064] N83-30137
SCIENCE
Studies of scientific disciplines: An annotated bibliography
[PB83-159954] N83-30319
SCIENTISTS
Engineering and Science Manpower Act of 1982
[GPO-96-196] N83-30323
SCINTILLATION
A comparison of radio wave and in situ observations of tropospheric turbulence and wind velocity N83-29506
Amplitude scintillation in propagation paths above 10 GHz N83-29508
An offsetting technique to study oscillations in direction of arrival in Earth-space paths N83-29509
SEA LEVEL
Cape Canaveral, Florida range reference atmosphere 0-70 km altitude
[NASA-TM-85253] N83-29935
SEA ROUGHNESS
Generalized approach to radio wave scatter from time-varying rough surfaces N83-29537
SEA WATER
On the stress-shear relation near a turbulent air-sea interface
[AD-A126252] N83-29952
SEAMOUNTS
The use of synthetic aperture radar to detect and chart submerged navigation hazards
[AD-A126071] N83-29567
SEARCH PROFILES
CODASYL Query Language Flat (CQLF) specifications
[PB83-164376] N83-30088
SEASAT 1
SEASAT synthetic-aperture radar data user's manual
[E83-10321] N83-29746
SEAWEEDS
Marine Biomass Program: Kelp biomass program summary
[PB83-167247] N83-29438
SECONDARY FLOW
Axial compressor middle stage secondary flow study
[NASA-CR-3701] N83-29174
SECURITY
Scientific communication and national security
[PB83-157800] N83-30320
SEDIMENT TRANSPORT
Prediction of flow depth and sediment discharge in open channels
[PB83-165696] N83-29468
Literature review of organic matter transport from marshes
[E83-10352] N83-29750
SEDIMENTARY ROCKS
Utilization of LANDSAT multispectral data in geobotanical investigations: The location of ironstone gravel in the Sam Houston National Forest
[E83-10361] N83-29772
SEDIMENTS
Roede formation: Early old red sandstone facies in the Silurian of Jaemtland Sweden
[PB83-165621] N83-29917
SEEDS
Continuing design work for the Sierra Cooperative Pilot Project
[PB83-164236] N83-29945
SEISMIC ENERGY
Seismic energy absorption in simple structures
[PB83-143917] N83-29464
Correlation between precision gravity and subsidence measurements at Cerro Prieto
[DE83-005870] N83-29907
Remote-reference magnetotelluric survey, Nevada test site and vicinity, Nevada and California
[DE82-019412] N83-29909
SEISMIC WAVES
Amplitude and phase of surface pressure produced by space transportation system: Mission 5
[AD-A125846] N83-29300
Seismic energy absorption in simple structures
[PB83-143917] N83-29464
A data memory system for a seafloor-earthquake-measuring instrument
[DE82-016808] N83-29665
Advanced seismological research and improved yield determination
[AD-A126001] N83-29895
Seismological discrimination and yield determination research
[AD-A126002] N83-29896
Vibroseismic excitation of elastic waves in a semi-infinite solid
[PB83-165365] N83-29916
SEISMOGRAPHS
A simple derivation of the formula to calculated synthetic long-period seismograms in a heterogeneous Earth by normal mode summation
[NASA-CR-172818] N83-29893
SEISMOLOGY
Static and seismic lateral pressures on Earth retaining structures, appendices
[PB83-164335] N83-29476
The Norwegian seismic array (NORSAR)
[AD-A126249] N83-29898
Advanced seismological research and improved yield determination
[AD-A125508] N83-29903
SELECTION
Commercial scale coal test. Volume 1: Selection of camp 1 coal
[DE83-007436] N83-29435
SELECTIVE FADING
Rates of change of propagation medium transfer functions during selective fadings N83-29501
A fading simulator for frequency selective fading and measurements with a 34 Mbit/s QPSK modem
[FTZ-445-TBR-22] N83-29589
SELF FOCUSING
Automatic focussing devices for photographic cameras
[PB83-155275] N83-29674
SEMANTICS
Requirements for natural language understanding in a system with graphic displays
[AD-A126065] N83-30072
SEMICONDUCTOR DEVICES
Design-dependent variability of pulse hardness of types of discrete semiconductor devices (intervendor variations)
[AD-A125776] N83-29560
Semiconductor measurement technology: Graphical solution for the helium leak detector and radioisotope methods of hermetic test, master graphs and instructions
[PB83-146845] N83-29672
Semiconductor technology program progress briefs
[PB83-165043] N83-29675
Method for growing low defect, high purity crystalline layers — photovoltaic cells
[NASA-CASE-NPO-15813-1] N83-30269
Semiconductor materials for high frequency solid state sources
[AD-A126242] N83-30276
Methods of submicron analysis as assistance for semiconductor technology
[BMFT-FB-T-83-032] N83-30288
SEMICONDUCTOR JUNCTIONS
Effects of surface preparation on the properties of single crystal CdTe junctions N83-30266
Theoretical modeling of EMP effects in semiconductor junction devices
[AD-A125976] N83-30273
SEMICONDUCTOR LASERS
Integrated optical transmitter and receiver
[AD-A125493] N83-29575
SEMICONDUCTORS (MATERIALS)
Semiconductor technology program progress briefs
[PB83-165043] N83-29675
Theory of reactions at a solid surface
[AD-A126202] N83-29697
Semiconductor electrodes. 50: Effect of mode of illumination and doping on photoelectrochemical behavior of phthalocyanine films
[AD-A125856] N83-30274
Semiconductor materials for high frequency solid state sources
[AD-A126242] N83-30276
SEMISPAN MODELS
An experimental investigation of the subcritical and supercritical flow about a swept semispan wing
[NASA-TM-84367] N83-29634
SENSITIVITY
Protecting against failure by brittle fracture in ferritic-steel shipping containers greater than 4 inches thick
[DE83-007462] N83-29372
Sensitivity characterization of low vulnerability (LOVA) propellants
[AD-A126130] N83-29415
Shock sensitivity of the explosive 2-(5-cyanotetrazolato) pentaamine cobalt(3) perchlorate (CP)
[DE82-013637] N83-29429
SENSORS
Variable acuity remote viewing system flight demonstration
[NASA-CR-170404] N83-29204
SEPARATED FLOW
Large-scale separation and wake closure/reattachment. The cascade problem
[UTRC83-13] N83-29629
Parabolized Navier-Stokes solutions of separation and trailing-edge flows
[NASA-TM-84378] N83-29635
Adverse pressure gradient corner flows
[AD-A126059] N83-29639
SEPARATORS
Polyvinyl alcohol battery separator containing inert filler
[NASA-CASE-LEW-13556-2] N83-29805
SEQUENCING
On sequential detection in dependent noise
[AD-A125836] N83-29600
SERIES EXPANSION
A new perturbation expansion for electromagnetic scattering by stochastic surfaces N83-29536
SET THEORY
Submodular set functions, matroids and the greedy algorithm: Tight worst-case bounds and some generalizations of the Rado-Edmonds theorem
[AD-A124981] N83-30134
SEWAGE
Advanced biological treatment of municipal wastewater through aquaculture
[PB83-159319] N83-29882
SHAFTS (MACHINE ELEMENTS)
Portable 90 deg proof loading device
[NASA-CASE-MSC-20250-1] N83-29707
An introduction to the FEARS (Finite Element Adaptive Research Solver) program
[AD-A127737] N83-30081
SHALE OIL
Metal coordination chemistry: Removal and recovery of metal compounds from heavy crude and shale oils with multidentate ligands
[DE83-006912] N83-29343
Summary of status of Environmental Protection Agency (EPA), Office of Mobile Sources Characterization Projects as of March, 1982
[PB83-163972] N83-29441
SHAPED CHARGES
Computer simulation of concrete penetration by shaped-charged jets
[DE83-007359] N83-29720
SHEAR PROPERTIES
The interaction of short-wavelength internal waves with a background current
[AD-A125822] N83-29581
On the stress-shear relation near a turbulent air-sea interface
[AD-A126252] N83-29952
SHEAR STRENGTH
Step cracks: Theory, experiment, and field observation
[DE82-014558] N83-29911
SHEAR STRESS
Effects of variation in load history on cyclic response of concrete flexural members
[PB83-153403] N83-29741
Mechanical behavior of shear wall vertical boundary members: An experimental investigation
[PB83-159764] N83-29742
Simple strength tests on and hydraulic fracturing of rock material
[PB83-165514] N83-29918
SHELLS (STRUCTURAL FORMS)
An experimental study of a high rotational speed propulsor
[AD-A126060] N83-29238
SHIP HULLS
The drag of a circular cylinder on or near a flat plat appropriate for ship-model turbulence stimulators
[AD-A126155] N83-29638
Load ratio and environmental effects on fatigue crack growth rates for several ship steels
[AD-A126285] N83-29735
SHIPS
Further development of Kospas-Salyut system N83-29287
Ferrous metal fires
[PB82-263161] N83-29387
Treatment of hypothermia in a seaman following the shipwreck of a coastal motorship
[DRIC-T-6835] N83-29988
SHOCK FRONTS
Estimates of air-column density evolution behind strong airblasts
[DE82-018313] N83-29645
SHOCK WAVES
Three dimensional modeling of shock initiation of heterogeneous explosives
[DE82-006145] N83-29426

Non-steady gas dynamic effects in the induction domain behind a strong shock wave
[CA-8229] N83-29633
Estimates of air-column density evolution behind strong airblasts
[DE82-018313] N83-29645
Optically Recording Velocity Interferometer System (ORVIS) for subnanosecond particle-velocity measurements in shock waves
[DE82-017621] N83-29659

SIDE-LOOKING RADAR
Stereo side-looking radar experiments
[NASA-CR-172905] N83-29489

SIGNAL ANALYSIS
Correlation between various radioelectrical data at 11.4, 11.6, and 35 GHz --- OTS and radiometer data
N83-29513
Objective acoustic quality inspection by pattern recognition and signal analysis. Design of an inspection system and application to an electric motor
[BMFT-FB-T-83-005] N83-29619

SIGNAL DETECTION
On sequential detection in dependent noise
[AD-A125836] N83-29600

SIGNAL DETECTORS
On sequential detection in dependent noise
[AD-A125836] N83-29600
Metal coated optical fibers for sensors
[AD-A126068] N83-30224

SIGNAL DISTORTION
Distortions in FM car radios caused by multipath reception and their reduction by means of antenna diversity N83-29502

SIGNAL FADING
Analysis of multipath fading observations on certain microwave paths in British Columbia N83-29498

SIGNAL PROCESSING
Detection criteria for a radar using coincidence processing
[AD-A126131] N83-29565
A FDM master-group signal encoding equipment
[AD-A126158] N83-29566
Angle of arrival estimation
[AD-A126038] N83-29571
Multi-dimensional signal procesing research program
[AD-A126333] N83-29580
Multidimensional signal restoration and band-limited extrapolation, 2
[AD-A125877] N83-29583
Three phase power factor controller
[NASA-CASE-MFS-25535-2] N83-29593
Optical signal processing
[AD-A125609] N83-29599
Some signal-processing issues in radar-target identification
[DE83-006554] N83-29698
The Norwegian seismic array (NORSAR)
[AD-A126249] N83-29898
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172903] N83-30059
Topics in robust statistical signal processing
[AD-A125931] N83-30126
An application of digital extrapolation in array processing
[AD-A125871] N83-30229

SIGNAL REFLECTION
Symmetric four antenna array resolves multiple reflectors with complex spectrum analysis of multiplexed closely spaced frequency soundings N83-29555

SIGNAL TO NOISE RATIOS
ELF PVS field strength measurements, April 1977
[AD-A126212] N83-29574
Spatial and temporal visual masking and visibility
[AD-A125696] N83-30000

SILICON
Organosilicon compounds and organosilicon polymer intermediates
[AD-A127752] N83-29403
Permanent damage effects in Si and AlGaAs/GaAs photodiodes
[DE82-018292] N83-29866
Silicon material development for terrestrial solar cells. Phase of exploration
[BMFT-FB-T-83-027] N83-29868
Materials characterization of silicon and analysis of recombination processes and impurities
[BMFT-FB-T-83-06] N83-30291

SILICON CARBIDES
Silicon carbide alloys
[AD-A125968] N83-29398
Process development for silicon carbide based structural ceramics
[AD-A125857] N83-29399

SILICON NITRIDES
Gas turbine parts made of injection molded silicon nitride
[BMFT-FB-T-83-021] N83-29240
Gas turbine parts made of injection molded silicon nitride and brazing of silicon nitride with metal
[BMFT-FB-T-83-028] N83-29377
Development of high-temperature resistant, noncorrosible, nonmetallic ceramic materials, especially silicon nitride, for heat exchangers in gas turbine application
[BMFT-FB-T-83-026] N83-29408

SILICON OXIDES
Influence of selected additives and CaO:SiO2 ratio on high-temperature strength of MgO refractories
[PB83-157875] N83-29410

SILICON TRANSISTORS
MOS-transistors for power applications
[BMFT-FB-T-83-059] N83-29623

SILICONES
Integrated circuits for optical sensing and display techniques
[BMFT-FB-T-83-052] N83-29622

SILOXANES
Synthesis and characterization of a new silicone multiblock polymer
[DE82-015189] N83-29406

SIMULATORS
Survey of missile simulation and flight mechanics facilities in NATO
[AGARD-AG-279] N83-29276
A fading simulator for frequency selective fading and measurements with a 34 Mbit/s QPSK modem
[FTZ-445-TBR-22] N83-29589

SINGLE CRYSTALS
Spectroscopic investigations of materials for tunable infrared lasers
[AD-A125538] N83-29689
Effects of surface preparation on the properties of single crystal CdTe junctions N83-30266

SINGULARITY (MATHEMATICS)
Singular perturbations and time-scale methods in control theory: Survey 1976-1982
[AD-A125908] N83-30100

SINTERING
Line-sinter processing of anorthosite for the recovery of alumina
[PB83-148435] N83-29379
Pressure sintering and creep deformation: A joint modeling approach --- ceramics
[DE83-006516] N83-29738

SITE SELECTION
Remote sensing program
[E83-10304] N83-29745
Manufacturing and cost analyses of heliostats based on the second-generation heliostat-development study
[DE83-006664] N83-29835
Solar energy system performance evaluation. Crown Realty 1, Lakewood, Colorado, December 1981 through March 1982
[DE82-019029] N83-29855
Magma source location survey
[DE82-019816] N83-29908
Remote-reference magnetotelluric survey, Nevada test site and vicinity, Nevada and California
[DE82-019412] N83-29909
Cross-borehole fracture mapping using electromagnetic geotomography
[DE82-012699] N83-29910
A process for locating shallow land-burial sites for low level radioactive waste
[DE83-008173] N83-30219

SKIDDING
Synthesis of frictional requirements research
[PB83-156315] N83-29466

SKYLAB 1
Solar observations during Skylab, April 1973 - February 1974. 1: Coronal X-ray structure. 2: Solar flare activity
[NASA-CR-172824] N83-30348

SLOPES
Analysis of roof snow load case studies: Uniform loads
[AD-A126330] N83-29455

SLUDGE
Advanced biological treatment of municipal wastewater through aquaculture
[PB83-159319] N83-29882

SLURRIES
Incorporation of high level wastes in SYNROC: Results from recent process engineering studies at Lawrence Livermore National Laboratory
[DE82-013402] N83-30214

SNOW
Analysis of roof snow load case studies: Uniform loads
[AD-A126330] N83-29455
Influence of surface type on the brightness temperature of snow-covered terrain --- satellite observation
N83-29532

SOCIAL FACTORS
Assessing very long-range impacts from a rapid climate change
[DE82-017229] N83-29937

SOCIOLOGY
Studies of scientific disciplines: An annotated bibliography
[PB83-159954] N83-30319

SODIUM
Chronic consumption of a low sodium diet: Hormonal and physiological effects during exercise in the heat
[AD-A124936] N83-29997

SODIUM CARBONATES
Behavior of nine solar-pond candidate salts
[DE83-006029] N83-29830

SODIUM CHLORIDES
Reactions of NaCl with gaseous SO3, SO2, and O2
[NASA-TM-83423] N83-29358
Behavior of nine solar-pond candidate salts
[DE83-006029] N83-29830

SODIUM SULFATES
Reactions of NaCl with gaseous SO3, SO2, and O2
[NASA-TM-83423] N83-29358

SODIUM VAPOR
Optical pumping for intense polarized ion sources
[DE82-012136] N83-30231

SOFTWARE TOOLS
FCSC (Federal Conversion Support Center) conversion tools survey
[PB83-172635] N83-30047
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172902] N83-30058
Advanced tools for software maintenance
[AD-A126146] N83-30071

SOIL MAPPING
Use of remote sensing for land use policy formulation
[E83-10326] N83-29747
Soil temperature investigations using satellite acquired thermal-infrared data in semi-arid regions --- Utah
[E83-10355] N83-29753
Agricultural land cover mapping in the context of a geographically referenced digital information system --- Carroll, Macon, and Gentry Counties, Missouri
[E83-10357] N83-29768

SOIL MOISTURE
Thermal behavior of fine-grained soils. Building science series
[PB83-164400] N83-29472
Utilization of LANDSAT multispectral data in geobotanical investigations: The location of ironstone gravel in the Sam Houston National Forest
[E83-10361] N83-29772
MORECS (Metrological Office Rainfall and Evaporation Calculation Scheme) discussion meeting, April 1981
[PB83-163212] N83-29798

SOIL SCIENCE
Sensing systems for measuring mechanical properties in ground masses. Volume 4: Static penetrometer
[PB83-155978] N83-29794

SOILS
Calculation of unsaturated hydraulic conductivity
[DE82-016325] N83-29876

SOLAR ACTIVITY
Spicules and surges. Part 1: Examination of two possible models
[NASA-CR-172778] N83-30347

SOLAR ARRAYS
Intermediate photovoltaic system application experiment operational performance report. Volume 6: CDC Light Manufacturing Bldg., San Bernardino, CA for August 1982
[DE83-010390] N83-29844

SOLAR AUXILIARY POWER UNITS
Solar assisted gas-fired absorption heat pump
[PB83-167502] N83-29477

SOLAR CELLS
Intermediate photovoltaic system application experiment operational performance report. Volume 6: CDC Light Manufacturing Bldg., San Bernardino, CA for August 1982
[DE83-010390] N83-29844
Silicon material development for terrestrial solar cells. Phase of exploration
[BMFT-FB-T-83-027] N83-29868

SOLAR COLLECTORS
Method of forming oxide coatings --- for solar collector heating panels
[NASA-CASE-LEW-13132-1] N83-29388
Thermally stratified tanks
[DE83-009089] N83-29641

Newman unit 1 advanced solar repowering advanced conceptual design
[DE82-014899] N83-29815
Measured performance results: Low-cost solar water heating systems in the San Luis Valley
[DE83-006488] N83-29831
Crosbyton Solar Power Project. Volume 8: Preliminary design of 55-MWe solar-fossil hybrid electric power plant at Crosbyton, Texas
[DE83-005285] N83-29832
Influence of adhesive shear deformation on laminate structural behavior with application to parabolic trough solar collectors
[DE83-010293] N83-29838
Development of low-cost integrated zeolite collector, supplement
[DE83-008484] N83-29840
Forced- and natural-convection studies on solar collectors for heating and cooling applications
[DE83-009863] N83-29841
Solar Total Energy Project summary description
[DE83-010232] N83-29842
The 10-MWe central-receiver solar-thermal pilot-plant test operation plan
[DE83-009737] N83-29843
Feasibility of night-sky radiation with heat pumps
[DE83-006812] N83-29850
Solar energy system performance evaluation. Scottsdale Courthouse, Scottsdale, Arizona, March, April, July, August, and October 1981 through February 1982
[DE82-019030] N83-29854
Solar energy system performance evaluation. Crown Realty 1, Lakewood, Colorado, December 1981 through March 1982
[DE82-019029] N83-29855

SOLAR ENERGY
Solar project description. Houston Construction Company single family residence, Eden Prairie, Minnesota March 19, 1982
[DE82-012337] N83-29456
Assessment of residential passive solar/gas-fired energy systems
[PB83-167239] N83-29479
Newman unit 1 advanced solar repowering
[DE82-014898] N83-29816
Establishment and furnishing of the Photovoltaic Center for the Southwest Residential Experiment Station
[DE82-904018] N83-29825
Passive solar concepts for multistory buildings
[DE82-012139] N83-29826
Development of a solar-desiccant dehumidifier, phase 2
[DE83-005407] N83-29829
Measured performance results: Low-cost solar water heating systems in the San Luis Valley
[DE83-006488] N83-29831
Crosbyton Solar Power Project. Volume 8: Preliminary design of 55-MWe solar-fossil hybrid electric power plant at Crosbyton, Texas
[DE83-005285] N83-29832
EMI from solar panels and inverters
[DE83-006028] N83-29833
Solar energy system performance evaluation. Scottsdale Courthouse, Scottsdale, Arizona, March, April, July, August, and October 1981 through February 1982
[DE82-019030] N83-29854
Solar energy system performance evaluation. Crown Realty 1, Lakewood, Colorado, December 1981 through March 1982
[DE82-019029] N83-29855
Solar storage for process heat and building application: A review of prior assessments
[DE82-019791] N83-29857

SOLAR FLARES
Solar and interplanetary ions near Earth N83-29891
Selective non-resonant acceleration of 3He++ and heavy ions by H+ cyclotron waves
[NASA-CR-172820] N83-30162
Solar-geophysical data prompt reports. Part 1: Data for October 1982, September 1982 and late data. Explanation of data reports issued as number 450 (Supplement) February 1982
[PB83-162057] N83-30331
Solar observations during Skylab, April 1973 - February 1974. 1: Coronal X-ray structure. 2: Solar flare activity
[NASA-CR-172824] N83-30348

SOLAR HEATING
Measured performance results: Low-cost solar water heating systems in the San Luis Valley
[DE83-006488] N83-29831
Forced- and natural-convection studies on solar collectors for heating and cooling applications
[DE83-009863] N83-29841

SOLAR HOUSES
Solar project description. Houston Construction Company single family residence, Eden Prairie, Minnesota March 19, 1982
[DE82-012337] N83-29456

SOLAR NEUTRINOS
Neutrino oscillations: Present and future experiments
[DE82-903207] N83-30186

SOLAR PHYSICS
Space research activities in the German Democratic Republic N83-29743
Solar-geophysical data comprehensive reports. Part 2: Data for May 1982, June 1980 and miscellanea. Explanation of data reports issued as Number 450 (supplement) February 1982
[PB83-162065] N83-30332
Spicules and surges. Part 1: Examination of two possible models
[NASA-CR-172778] N83-30347

SOLAR PONDS (HEAT STORAGE)
Behavior of nine solar-pond candidate salts
[DE83-006029] N83-29830
Performance of Living History Farm's salt-gradient solar pond
[DE83-009066] N83-29839
Heat and mass extraction from solar ponds: Analysis and development of a laboratory facility
[DE82-013888] N83-29856

SOLAR RADIATION
ELF (Extremely Low Frequency) PVS (Propagation Validation System) field strength measurements, January and February, 1978
[AD-A126208] N83-29577
Single and multiple scattered solar radiation
[AD-A126323] N83-30349

SOLAR RADIO EMISSION
Solar-geophysical data prompt reports. Part 1: Data for October 1982, September 1982 and late data. Explanation of data reports issued as number 450 (Supplement) February 1982
[PB83-162057] N83-30331

SOLAR REFLECTORS
Environmental degradation of solar optical materials. Volume 1: Literature survey
[DE83-010298] N83-29837

SOLAR X-RAYS
Solar observations during Skylab, April 1973 - February 1974. 1: Coronal X-ray structure. 2: Solar flare activity
[NASA-CR-172824] N83-30348

SOLID CRYOGEN COOLING
Cooling by conversion of para to ortho-hydrogen
[NASA-CASE-GSC-12770-1] N83-29324

SOLID ELECTRODES
Semiconductor electrodes. 50: Effect of mode of illumination and doping on photoelectrochemical behavior of phthalocyanine films
[AD-A125856] N83-30274

SOLID PROPELLANT ROCKET ENGINES
AFRPL technical objective document FY 84
[AD-A125495] N83-29309

SOLID ROCKET PROPELLANTS
The duration period of propellants for classical and rocket armament
[AD-A126219] N83-29417

SOLID STATE DEVICES
Joint Services Electronics Program, Stanford University
[AD-A126140] N83-29602
Numerical solution of a coupled pair of elliptic equations from solid state electronics
[NASA-CR-172128] N83-30109

SOLID STATE LASERS
Solid-state lasers for bathymetry and communications. Studies of four rare-earth materials
[AD-A126098] N83-29683
Bibliography of Soviet laser developments, no. 55, September - October 1981
[AD-A126022] N83-29686
Bibliography of Soviet laser developments, no. 56, November - December 1981
[AD-A126023] N83-29687

SOLID WASTES
Recovery of sulfur and accessory metals from a leaching process residue
[PB83-157651] N83-29383
Recycling municipal ferrous scrap
[PB83-156968] N83-29384

SOLIDIFICATION
A fundamental study of tool steels processed from rapidly solidified powders
[AD-A126163] N83-29362
Method and apparatus for supercooling and solidifying substances
[NASA-CASE-MFS-25242-1] N83-29650

SOLIDIFIED GASES
Cooling by conversion of para to ortho-hydrogen
[NASA-CASE-GSC-12770-1] N83-29324

SOLIDS
The hydrolysis of phosphate esters on solids
[AD-A126119] N83-29329
Venturi design for metering solids flow in gas-solids suspensions
[DE83-004314] N83-29660

SOLUBILITY
Silicon carbide alloys
[AD-A125968] N83-29398

SOLUTES
Dispersion in fracture networks
[DE83-005584] N83-29913

SOLVENT EXTRACTION
Alcohol-Fuels Grant Program. Low-energy route for alcohol/gasohol recovery from fermentor beer
[DE83-009665] N83-29423

SOLVENT REFINED COAL
Identification and comparative genotoxicity of polycyclic aromatic hydrocarbons and related nitrogen-containing heteroatomic species in products from coal liquefaction processes
[DE83-006939] N83-29312

SOLVENTS
Recovery of sulfur and accessory metals from a leaching process residue
[PB83-157651] N83-29383
A solvent resistant, thermoplastic aromatic poly(imidesulfone) and process for preparing same
[NASA-CASE-LAR-12858-2] N83-29391

SONAR
Multistatic sonar with omnidirectional receivers
[REPT-10-82] N83-29486

SOOT
Diffusion-flame studies of the chemical and physical mechanisms of soot formation from aromatic and substituted-aromatic fuels
[DE83-009093] N83-29334

SOUND FIELDS
Amplitude and phase of surface pressure produced by space transportation system: Mission 5
[AD-A125846] N83-29300
The S-matrix and acoustic signal structure in simple and compound waveguides
[AD-A125583] N83-30129

SOUND PROPAGATION
A finite difference solution for the propagation of sound in near sonic flows
[NASA-TM-84663] N83-30167

SOUND WAVES
Computation of propagation speed and reflection of axially symmetric waves in composite cylinders with application to impedance tube and calibrator
[AD-A125875] N83-29320
The S-matrix and acoustic signal structure in simple and compound waveguides
[AD-A125583] N83-30129
Numerical calculations of ultrasonic fields
[DE82-013811] N83-30169
Versatile three-dimensional Hamiltonian ray-tracing computer program for acoustic waves in the atmosphere
[PB83-149930] N83-30170

SPACE ERECTABLE STRUCTURES
Beregovoy on future construction in space N83-29284

SPACE FLIGHT
Research opportunities in cardiovascular deconditioning, phase 1
[NASA-CR-3707] N83-29992
Research opportunities in space motion sickness, phase 2
[NASA-CR-3708] N83-29993

SPACE HEATING (BUILDINGS)
Warm air systems. Part 1: Temperatures and temperature efficiencies
[PB83-148908] N83-29484
Warm air systems. Part 2: Tracer gas measurements and ventilation efficiencies
[PB83-148916] N83-29485
Passive solar concepts for multistory buildings
[DE82-012139] N83-29826

SPACE INDUSTRIALIZATION
Research in space commercialization, technology transfer and communications
[NASA-CR-172886] N83-30326

SPACE LAW
Legal delimitation of airspace N83-29290

SPACE OPERATIONS CENTER (NASA)
Research in space commercialization, technology transfer and communications
[NASA-CR-172887] N83-30327

SPACE PERCEPTION
Brain responses and information processing 3: Hemispheric asymmetry in event related potentials and performance during discrimination of line orientation and velocity of motion
[AD-A125681] N83-30011
SPACE PLASMAS
Proceedings of the 1st Space Plasma Computer Analysis Network (SCAN) Workshop --- space plasma computer networks
[NASA-TM-82514] N83-30095
SPACE PLATFORMS
Development of deployable structures for large space platform systems, volume 2
[NASA-CR-170800] N83-29305
Evolutionary space platform concept study. Volume 2, part 2: Manned space platform concepts
[NASA-CR-170829] N83-29306
SPACE PROGRAMS
USSR report: Space, No. 22
[JPRS-83612] N83-29280
SPACE SHUTTLE MAIN ENGINE
Investigation of the feasibility of temperature profiling optical diagnostics in the SSME fuel pre-burner
[NASA-CR-170799] N83-29308
SPACE SHUTTLE ORBITERS
Pressure distributions obtained on a 0.04-scale and 0.02-scale model of the Space Shuttle Orbiter's forward fuselage in the Langley continuous flow hypersonic tunnel
[NASA-TM-84630] N83-29278
Shuttle EVA description and design criteria
[NASA-TM-85355] N83-29297
Predictions of entry heating for lower surface of shuttle orbiter
[NASA-TM-84624] N83-29631
SPACE SHUTTLES
Role of simulation and emulation in the development of Shuttle-Centaur (STS-Centaur)
[NASA-TM-83326] N83-29292
Interactions Measurements Payload for Shuttle (IMPS)
[AD-A125841] N83-29299
Amplitude and phase of surface pressure produced by space transportation system: Mission 5
[AD-A125846] N83-29300
SPACE STATIONS
Robots on Venus N83-29283
Beregovoy on future construction in space N83-29284
SPACE SUITS
Propellant handler's ensemble in-suit noise measurements
[AD-A125507] N83-30040
SPACE TRANSPORTATION SYSTEM
Role of simulation and emulation in the development of Shuttle-Centaur (STS-Centaur)
[NASA-TM-83326] N83-29292
Shuttle EVA description and design criteria
[NASA-TM-85355] N83-29297
Proving the Space Transportation System: The orbital flight test program
[NASA-FACTS-137-83] N83-29298
SPACE TRANSPORTATION SYSTEM 4 FLIGHT
Atmospheric observations for STS-4 landing
[NASA-TM-82495] N83-29923
SPACE TRANSPORTATION SYSTEM 6 FLIGHT
Atmospheric environment for Space Shuttle (STS-6) launch
[NASA-TM-82529] N83-29926
SPACE WEAPONS
Defense against space weapons
[AD-A126159] N83-29279
SPACEBORNE EXPERIMENTS
Fluid dynamic experiment in a surface tension tank: Phase 1/Phase 2A
[BMFT-FB-W-83-002] N83-29649
SPACEBORNE TELESCOPES
Focusing and imaging sharp line X-ray and gamma-ray sources using variable-metric diffraction crystals
[DE83-007789] N83-30285
SPACECRAFT COMMUNICATION
Propagation effects handbook for satellite systems design. A summary of propagation impairments on 10 to 100 GHz satellite links with techniques for system design
[NASA-RP-1082(03)] N83-29491
Capabilities, limitations, and use of BC SAT-R2 conference software
[NASA-TM-83383] N83-29493
SATNET development and operation, Pluribus Satellite IMP development, Internet operations and maintenance, Mobile Access Terminal Network
[AD-A125959] N83-29563
Angle of arrival estimation
[AD-A126038] N83-29571
SPACECRAFT COMPONENTS
Electrical self-aligning connector
[NASA-CASE-MFS-25211-2] N83-29592
SPACECRAFT CONSTRUCTION MATERIALS
Curved cap corrugated sheet
[NASA-CASE-LAR-12884-1] N83-29446
SPACECRAFT CONTAMINATION
Interactions Measurements Payload for Shuttle (IMPS)
[AD-A125841] N83-29299
SPACECRAFT DEFENSE
Defense against space weapons
[AD-A126159] N83-29279
SPACECRAFT DESIGN
Interactive analysis of a large aperture Earth observations satellite
[NASA-TM-85838] N83-29304
SPACECRAFT DOCKING
Satellite retrieval system
[NASA-CASE-MFS-25403-1] N83-29303
SPACECRAFT ELECTRONIC EQUIPMENT
Electrical self-aligning connector
[NASA-CASE-MFS-25211-2] N83-29592
SPACECRAFT ENVIRONMENTS
Vibration measurement and attenuation for Spacelab experiments of the D1 mission
[BMFT-FB-W-83-003] N83-29301
Current concepts of the CELSS program N83-30017
SPACECRAFT LANDING
Atmospheric observations for STS-4 landing
[NASA-TM-82495] N83-29923
SPACECRAFT LAUNCHING
Atmospheric environment for Space Shuttle (STS-6) launch
[NASA-TM-82529] N83-29926
SPACECRAFT ORBITS
Attitude dynamics and stability of large flexible structures in orbit N83-29729
SPACECRAFT PROPULSION
AFRPL technical objective document FY 84
[AD-A125495] N83-29309
SPACECRAFT RECOVERY
Satellite retrieval system
[NASA-CASE-MFS-25403-1] N83-29303
SPACECRAFT STABILITY
Attitude dynamics and stability of large flexible structures in orbit N83-29729
SPACELAB PAYLOADS
Vibration measurement and attenuation for Spacelab experiments of the D1 mission
[BMFT-FB-W-83-003] N83-29301
SPARK IGNITION
Development of the cone calorimeter, a bench scale heat release rate apparatus based on oxygen consumption
[PB83-151266] N83-29673
SPATIAL DEPENDENCIES
Formation of quark-gluon plasma in nuclear collisions
[DE82-018521] N83-30184
SPATIAL DISTRIBUTION
Statistics on the fine scale structure of rain in Stockholm, 1977-1979 N83-29521
Radar modeling of space diversity associated with slant path rain attenuation at variable path angles, frequencies, and drop size distributions N83-29551
Site diversity in Earth to satellite links: Radar measurements and theoretical predictions N83-29552
Meaning and construction of a geographic base file for a spatially oriented information system
[PB83-166108] N83-29961
SPATIAL FILTERING
Beam-profile measurement of laser pulses using a spatial filter to sample the hermite modes for a string of pulses
[PB83-156612] N83-29702
Beam-profile measurement of laser pulses using a spatial filter to sample the hermite modes for a string of pulses
[PB83-164996] N83-29705
SPATIAL RESOLUTION
LANDSAT imagery: Description of products available from the CSIR Satellite Remote Sensing Centre
[E83-10354] N83-29752
LANDSAT-4 Scientific Characterization: Early Results Symposium
[E83-10356] N83-29754
Spatial resolution estimation of LANDSAT-4 TM and MSS data N83-29766
Data source and information carrier as a base for a spatial-orientated information system
[PB83-166090] N83-29962
SPECIFICATIONS
Functional specifications for a federal information processing standard data dictionary system
[PB83-169441] N83-30049
CODASYL Query Language Flat (CQLF) specifications
[PB83-164376] N83-30088
Initial Graphics Exchange Specification (IGES), version 2.0
[PB83-137448] N83-30092
SPECTRAL BANDS
Analytical design of multispectral sensors
[E83-10337] N83-29748
LANDSAT imagery: Description of products available from the CSIR Satellite Remote Sensing Centre
[E83-10354] N83-29752
LANDSAT-4 hightlights N83-29755
Spectral characterization of the LANDSAT-4 thematic mapper sensors N83-29760
Thematic mapper intraband radiometric performance N83-29764
SPECTRAL REFLECTANCE
In-progress absolute radiometric inflight calibration of the LANDSAT-4 sensors N83-29763
SPECTRAL RESOLUTION
TM report N83-29757
Spectral characterization of the LANDSAT-4 thematic mapper sensors N83-29760
SPECTRAL SIGNATURES
Remote sensing investigations of wetland biomass and productivity for global biosystems research N83-29767
Agricultural land cover mapping in the context of a geographically referenced digital information system --- Carroll, Macon, and Gentry Counties, Missouri
[E83-10357] N83-29768
A study of the temporal and spectral characteristics of gamma ray bursts
[NASA-TM-85031] N83-30350
SPECTROMETERS
Los Alamos portable beta-ray spectrometer
[DE83-007575] N83-29667
SPECTROSCOPIC ANALYSIS
Rapid-screening-luminescence techniques for trace organic analysis
[DE82-017518] N83-29341
SPECTROSCOPY
CO + H sub 2 reactions over nitrogen-modified iron catalysts
[DE83-006579] N83-29335
Spectroscopic properties of metal monoxides and hydroxides important in the ionosphere
[AD-A126332] N83-29905
Quark-antiquark bound-state spectroscopy and QCD
[DE83-007082] N83-30204
SPECTRUM ANALYSIS
Symmetric four antenna array resolves multiple reflectors with complex spectrum analysis of multiplexed closely spaced frequency soundings N83-29555
Non-self-adjoint inverse spectral theoretic derivation of a complex von Neumann-Wigner potential
[DE83-009064] N83-30137
SPEECH RECOGNITION
Description of STIDAS 2-D. Part 1: General system and program description --- Speech Transmission Index (STI)
[IZF-1982-29-PT-1] N83-29587
SPHERES
Scattering by spheroidal and rough particles
[AD-A125767] N83-29558
On the permanence property in spherical spline interpolation
[AD-A126263] N83-30121
SPHERICAL WAVES
Tables of spherical Bessel functions of the first and second kinds for complex arguments
[AD-A125876] N83-30130
SPICULES
Spicules and surges. Part 1: Examination of two possible models
[NASA-CR-172778] N83-30347
SPILLING
A spillage detector for liquid chromatography systems
[NASA-CASE-MSC-20206-1] N83-29325
SPLICING
Behavior and design of reinforced concrete column-type lapped splices subjected to high-intensity cyclic loading
[PB83-165134] N83-29474
Field expedient repair of fiber optic cables
[AD-A126075] N83-30225
SPLINE FUNCTIONS
On the permanence property in spherical spline interpolation
[AD-A126263] N83-30121
SPONTANEOUS COMBUSTION
Spontaneous ignition characteristics of hydrocarbon fuel-air mixtures N83-29231
SPRAY NOZZLES
Numerical simulation for droplet combustion using Lagrangian hydrodynamics N83-29210
Structure of evaporating and combusting sprays: Measurements and predictions N83-29211

SPRAYED COATINGS
Creep of plasma sprayed zirconia
[NASA-CR-167668] N83-29393
SPRAYING
Fuel spray diagnostics N83-29212
SPREAD SPECTRUM TRANSMISSION
Coding for frequency-hopped spread-spectrum channels with partial-band interference
[AD-A125872] N83-29582
SPUTTERING
Oxygen and titanium sputtering yields as determined by laser fluorescence and Auger electron spectroscopy for monolayer oxygen coverage of polycrystalline Ti
[DE83-007683] N83-29373
Laser-fluorescence measurements of hydrogen and metal densities in the doublet 3 Tokamak
[DE83-008499] N83-30251
STABILITY
A theory of rotating stall of multistage axial compressors
[NASA-CR-3685] N83-29175
Finite-difference, spectral and Galerkin methods for time-dependent problems
[NASA-CR-172149] N83-30110
Stability analysis of finite difference schemes for the advection-diffusion equation
[NASA-CR-172823] N83-30123
Creation of high energy electron tails due to the modified 2-stream instability
[NASA-CR-172819] N83-30171
STAGNATION TEMPERATURE
A gas jet impacting a cavity N83-29627
STALLING
Techniques for determining engine stall recovery characteristics N83-29265
Designing for stability in advanced turbine engines N83-29266
STANDARDIZATION
Definition of standards and methods of calibrating for Imaging Microwave Radiometers (IMR)
[ESA-CR(P)-1724] N83-29671
STANDARDS
Recycling municipal ferrous scrap
[PB83-156968] N83-29384
Report of the 67th National Conference on Weights and Measures 1982
[PB83-167148] N83-29473
Analysis of in-use fuel economy data, stage 1
[PB83-144162] N83-29721
EMI from solar panels and inverters
[DE83-006028] N83-29833
VOC (Volatile Organic Compound) fugitive emissions in petroleum refining industry: Background information for proposed standards
[PB83-157743] N83-29885
GKS (Graphical Kernel System), the first graphics standard
[PB83-166595] N83-30090
Radiation standards and calibrations
[DE82-019748] N83-30200
Journal of Research of the National Bureau of Standards, volume 87, number 5, September - October 1982
[PB83-164541] N83-30305
STARCHES
Direct enzymatic extraction of starch from corn as an energy-saving alternative to production of high-fructose syrup
[DE82-008314] N83-29822
STARS
Catalogue of 20457 star positions obtained by photography in the declination zone -48 deg to -54 deg (1950)
[AD-A126161] N83-30330
STATIC LOADS
Performance of a quantitative study of instability-related delamination growth
[NASA-CR-166046] N83-29314
STATIC PRESSURE
Static and seismic lateral pressures on Earth retaining structures, appendices
[PB83-164335] N83-29476
STATISTICAL ANALYSIS
Statistical summaries of fatigue data for design purposes
[NASA-CR-3697] N83-29731
Advanced biological treatment of municipal wastewater through aquaculture
[PB83-159319] N83-29882
Non-parametric statistical software for the TRS-80 microcomputer
[AD-A126055] N83-30073
Topics in robust statistical signal processing
[AD-A125931] N83-30126
Higher order asymptotics for simple linear rank statistics
[MATH-CENTRE-TRACTS-151] N83-30147
New-particle spectroscopy, quarkonium and gluonic mesons
[DE83-007012] N83-30203
Entropy and information in the design and analysis of imaging systems N83-30221
The 3 papers on rule-based estimation of statistics on databases
[AD-A126198] N83-30310
STATISTICAL DISTRIBUTIONS
The effect of environmental change in single-subject experiments
[AD-A125779] N83-30150
STEADY STATE
Improvements in the dynamic simulation of gas turbines N83-29264
Model of the steady-state performance of an absorption heat pump
[PB83-152314] N83-29471
Analysis of the adsorption process and of desiccant cooling systems: A pseudo- steady-state model for coupled heat and mass transfer
[DE83-005752] N83-29828
Intrinsically irreversible heat engines
[DE82-015729] N83-29853
STEAM
Newman unit 1 advanced solar repowering advanced conceptual design
[DE82-014899] N83-29815
Newman unit 1 advanced solar repowering
[DE82-014898] N83-29816
Conceptual design of a direct-contact natural-gas-fired downhole steam generator
[DE82-019875] N83-29851
STEAM FLOW
Downhole steam-generator study. Volume 2: Design summary
[DE82-019824] N83-29852
Increasing the efficiency of coal-fired power plants by means of a transition to maximum steam conditions
[BMFT-FB-T-83-033] N83-29869
STEAM TURBINES
Full-scale turbine-missile-casing tests
[DE83-007427] N83-29310
STEELS
A fundamental study of tool steels processed from rapidly solidified powders
[AD-A126163] N83-29362
Changes in residual stress, domain size and microstrain during fatigue of 1008 steel
[AD-A126058] N83-29364
Removal of hydrogen from plated high strength steel by baking: A statistically designed study
[AD-A126100] N83-29366
In-plant recycling of stainless and other specialty steelmaking wastes. Report on investigations, 1982
[PB83-157701] N83-29382
Dynamic-pressure measurements using an electronically scanned pressure module
[NASA-TM-84650] N83-29655
Noise test-resilient wheels Massachusetts Bay Transportation Authority green line
[PB83-148635] N83-30329
STEEPEST DESCENT METHOD
Non-linear regression
[PB83-167643] N83-30146
STELLAR EVOLUTION
Globular clusters and X-ray bursters
[PR-764] N83-30333
STELLAR MASS EJECTION
Solar-geophysical data comprehensive reports. Part 2: Data for May 1982, June 1980 and miscellanea. Explanation of data reports issued as Number 450 (supplement) February 1982
[PB83-162065] N83-30332
STELLAR SPECTRA
Einstein X-ray observations of cataclysmic variables
[DE82-015804] N83-30352
STELLARATORS
Stellarator physics evaluation studies
[DE83-006359] N83-30240
Neutral beam heating in stellarators: A numerical approach
[DE83-010458] N83-30242
Physical and engineering constraints for Tokamak reactors and helical coils
[DE82-019251] N83-30247
STEREOCHEMISTRY
Restrained least-squares program (RESLSQ) users manual
[AD-A126171] N83-30082
STEREOSCOPY
Stereo side-looking radar experiments
[NASA-CR-172905] N83-29489
STIFFNESS
Vibration in planetary gear systems with unequal planet stiffnesses
[NASA-TM-83428] N83-29709
Mechanical behavior of shear wall vertical boundary members: An experimental investigation
[PB83-159764] N83-29742
STIMULATED EMISSION DEVICES
The free electron laser: A resource paper
[PB83-148931] N83-29704
STIRLING CYCLE
Combined-cycle heat pump analysis program
[PB83-161042] N83-29483
Stirling engine design manual, 2nd edition
[NASA-CR-158088] N83-30328
STIRRING
Fast computational kinetics program N83-29227
STOCHASTIC PROCESSES
Structure of evaporating and combusting sprays: Measurements and predictions N83-29211
The development and testing of a stochastic variational principle for electromagnetic scattering N83-29535
A new perturbation expansion for electromagnetic scattering by stochastic surfaces N83-29536
Generalized approach to radio wave scatter from time-varying rough surfaces N83-29537
Singular perturbations and time-scale methods in control theory: Survey 1976-1982
[AD-A125908] N83-30100
Case-studies in direct digital control of stochastic systems
[OUEL-1430/82] N83-30102
Survey of some results from the theory of stochastic approximations with a view to system identification
[PB83-161943] N83-30142
On the variance of probability estimates with correlated data
[AD-A126336] N83-30153
STOICHIOMETRY
Synthesis and characterization of a new silicone multiblock polymer
[DE82-015189] N83-29406
STOKES LAW (FLUID MECHANICS)
Third order polarization for multifrequency coherent anti-Stokes Raman scattering
[AD-A125434] N83-29330
STORABLE PROPELLANTS
The duration period of propellants for classical and rocket armament
[AD-A126219] N83-29417
STORAGE RINGS (PARTICLE ACCELERATORS)
Polarized E + - polarized p colliding beams: Physics issues
[DE83-006645] N83-30295
STORAGE STABILITY
Tri-State Synfuels project commercial scale coal test. Volume 2A: Collection and shipment mine, barge, ship and train programs
[DE83-007443] N83-29431
STORAGE TANKS
Thermally stratified tanks
[DE83-009089] N83-29641
STORM DAMAGE
Prediction of hurricane storm surges: A state-of-the-art survey
[PB83-163915] N83-29946
STORMS
National severe local storms operations plan
[PB83-163998] N83-29940
STORMS (METEOROLOGY)
The operational meteorology of convective weather. Volume 1: Operational mesoanalysis
[PB83-162321] N83-29941
STRAIN GAGES
Securable bearing stress-strain indicator --- for monitoring torque on bolts incorporated in pressure vessels
[NASA-CASE-LAR-12774-1] N83-29654
STRAIN HARDENING
Stress intensity factors for radial cracks in a pre-stressed, thick-walled cylinder of strain-hardening materials
[AD-A125552] N83-29736
STRAKES
A numerical study of Strake aerodynamics
[AD-A125882] N83-29182
STRANGENESS
Particle physics experiments, 1981
[PB83-164715] N83-30207
STRATEGY
The structure of divide and conquer algorithms
[AD-A126086] N83-30124
STRATIFICATION
Thermally stratified tanks
[DE83-009089] N83-29641

Electromagnetic surface fields due to a magnetic dipole buried in a three-layered Earth. Report of investigations, 1982
[PB83-148064] N83-29799

STRATOCUMULUS CLOUDS
On the joint bimodality of temperature and moisture near stratocumulus cloud tops
[NASA-TM-85008] N83-29927

STRATOSPHERE
Mechanisms of stratospheric ozone transport N83-29892
The 1980 stratospheric-tropospheric exchange experiment
[NASA-TM-84297] N83-29924

STREAK CAMERAS
Design of neutron streak camera for fusion diagnostics
[DE82-018393] N83-29662
Investigations of other operating points for the RCA streak tube in the Lawrence Livermore National Laboratory streak camera
[DE82-019065] N83-29663

STRESS (PHYSIOLOGY)
Survey and analysis of the heat casualty prevention experiment for Resphiblex 1-81, operation 'Lancer Eagle', 43D, MAU
[AD-A125847] N83-30004

STRESS ANALYSIS
Analysis of roof snow load case studies: Uniform loads
[AD-A126330] N83-29455
Investigation of the conservatism associated with different combinations between primary and secondary piping responses
[DE83-007417] N83-29740
An introduction to the FEARS (Finite Element Adaptive Research Solver) program
[AD-A127737] N83-30081

STRESS INTENSITY FACTORS
Stress intensity factor distribution for natural flaws grown under mode 1 loading using 3-d photoelasticity N83-29730
Stress intensity factors for radial cracks in a pre-stressed, thick-walled cylinder of strain-hardening materials
[AD-A125552] N83-29736

STRESS-STRAIN RELATIONSHIPS
Securable bearing stress-strain indicator --- for monitoring torque on bolts incorporated in pressure vessels
[NASA-CASE-LAR-12774-1] N83-29654
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172904] N83-30060

STRESSES
Designing for fighter engine transients N83-29243
On the stress-shear relation near a turbulent air-sea interface
[AD-A126252] N83-29952

STRUCTURAL ANALYSIS
CO + H sub 2 reactions over nitrogen-modified iron catalysts
[DE83-006579] N83-29335
The Department of Energy (DOE) research program in structural analysis of vertical-axis wind turbines
[DE82-017072] N83-29858
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172903] N83-30059

STRUCTURAL DESIGN
Plastics in the 80's
[PB83-163311] N83-29409
States of the art and practice in the optimum seismic design and analytical response prediction of r/c frame-wall structures
[PB83-147736] N83-29465
Statistical summaries of fatigue data for design purposes
[NASA-CR-3697] N83-29731
Passive solar concepts for multistory buildings
[DE82-012139] N83-29826

STRUCTURAL DESIGN CRITERIA
Engine Handling
[AGARD-CP-324] N83-29241
Designing for fighter engine transients N83-29243
The criteria used for assessing acceptable engine handling on UK military aircraft N83-29244
Design and development of a disc-windmill atomizer for aerial applications
[AE-8223] N83-29449
Development of the cone calorimeter, a bench scale heat release rate apparatus based on oxygen consumption
[PB83-151266] N83-29673
The Department of Energy (DOE) research program in structural analysis of vertical-axis wind turbines
[DE82-017072] N83-29858

STRUCTURAL ENGINEERING
Analysis of roof snow load case studies: Uniform loads
[AD-A126330] N83-29455
Daze fasteners
[NASA-CASE-LAR-13009-1] N83-29706

STRUCTURAL FAILURE
Application of advanced reliability methods to local strain fatigue analysis
[NASA-CR-168198] N83-29734

STRUCTURAL MEMBERS
Load ratio and environmental effects on fatigue crack growth rates for several ship steels
[AD-A126285] N83-29735

STRUCTURAL PROPERTIES (GEOLOGY)
Application of SEASAT-1 Synthetic Aperture Radar (SAR) data to enhance and detect geological lineaments and to assist LANDSAT landcover classification mapping --- Appalachian Region, West Virginia
[E83-10365] N83-29776
Sensing systems for measuring mechanical properties in ground masses. Volume 2: In situ testing with the Menard pressuremeter
[PB83-155952] N83-29792
Plate tectonic behaviour in the east Mediterranean region to be detected by baseline variations from satellite laser ranging
[PB83-159772] N83-29920

STRUCTURAL VIBRATION
ACOSS twelve (Active Control of Space Structures)
[AD-A126053] N83-29307

STYRENES
Phase equilibria and transition in mixtures of a homopolymer and a block copolymer. 1: Small-angle X-ray scattering study
[AD-A125818] N83-29396

SUBCRITICAL FLOW
An experimental investigation of the subcritical and supercritical flow about a swept semispan wing
[NASA-TM-84367] N83-29634

SUBMARINES
ELF (Extremely Low Frequency) PVS (Propagation Validation System) field strength measurements, January and February, 1978
[AD-A126208] N83-29577
Voice control of an unmanned submersible
[AD-A125523] N83-30039

SUBSONIC FLOW
The evaluation of the rolling moments induced by wraparound fins
[NASA-TM-84381] N83-29180
Subsonic panel method for designing wing surfaces from pressure distribution
[NASA-CR-3713] N83-29198

SUBSTRATES
Method of forming oxide coatings --- for solar collector heating panels
[NASA-CASE-LEW-13132-1] N83-29388

SUGARS
Production of butanol by fermentation in the presence of co-culture of clostridium
[NASA-CASE-NPO-16203-1] N83-29806

SULFATES
National performance audit program: The 1980 proficiency survey for sulfur dioxide, nitrogen dioxide, carbon monoxide, sulfate, nitrate, lead and high volume flow
[PB83-164863] N83-29354

SULFUR
Field environmental evaluation plan for sulfur use in pavements
[PB83-156687] N83-29461

SULFUR DIOXIDES
National performance audit program: The 1980 proficiency survey for sulfur dioxide, nitrogen dioxide, carbon monoxide, sulfate, nitrate, lead and high volume flow
[PB83-164863] N83-29354
Gaseous continuous emission monitoring systems. Performance specification guidelines for SO2, NOx, CO2, O2 and TRS
[PB83-161646] N83-29886

SUN
Solar-geophysical data comprehensive reports. Part 2: Data for May 1982, June 1980 and miscellanea. Explanation of data reports issued as Number 450 (supplement) February 1982
[PB83-162065] N83-30332

SUPERCONDUCTING MAGNETS
Physical and engineering constraints for Tokamak reactors and helical coils
[DE82-019251] N83-30247

SUPERCONDUCTORS
Superconducting niobium thin-film gradiometer technology program
[AD-A126133] N83-29656
Probing the nuclear structure with heavy-ion reactions
[DE82-017316] N83-30195

SUPERCOOLING
Method and apparatus for supercooling and solidifying substances
[NASA-CASE-MFS-25242-1] N83-29650
A new characterization of supercooled clouds below 10,000 feet AGL (Above Ground Level)
[FAA-CT-83-22] N83-29922

SUPERCRITICAL FLOW
An experimental investigation of the subcritical and supercritical flow about a swept semispan wing
[NASA-TM-84367] N83-29634

SUPERCRITICAL WINGS
Wind-tunnel investigation of aerodynamic loading on a 0.237-scale model of a remotely piloted research vehicle with a thick, high-aspect-ratio supercritical wing
[NASA-TM-84614] N83-29176

SUPERHIGH FREQUENCIES
Attenuation by rain on Earth-space paths at 13 GHz N83-29512
Correlation between various radioelectrical data at 11.4, 11.6, and 35 GHz --- OTS and radiometer data N83-29513
Some X-band measurements of the dielectric constant of dust N83-29514
Measurements of the complex refractive index of soils and airborne particles N83-29515
Effects of dust/sandstorm on some aspects of microwave propagation N83-29516
Theoretical and experimental investigation of propagation attenuation by equatorial and tropical precipitation N83-29519
Rain rate profile effects on radiowave attenuation above 10 GHz N83-29520
Correlation of 6 and 4 GHz rain-induced depolarization at low elevation angle --- using INTELSAT satellites N83-29529
Influence of surface type on the brightness temperature of snow-covered terrain --- satellite observation N83-29532
The dependency on the propagation environment of the frequency scaling of attenuation N83-29550
Site diversity in Earth to satellite links: Radar measurements and theoretical predictions N83-29552
Effect of low-intensity superhigh-frequency energy on respiration and oxidative phosphorylation of organ mitochondria and activity of some blood enzymes N83-29975
Problems of studying the biological effect of electromagnetic fields discussed N83-29976
Local use of microwave electromagnetic energy on biologically active points N83-29978
Genetic danger of non-thermal intensity microradio waves and its hygienic aspects N83-29987

SUPERMASSIVE STARS
Phenomenological model of the nucleus of the galaxy
[PR-728] N83-30335

SUPERSONIC FLOW
Finite area method for nonlinear supersonic conical flows
[NASA-CR-172148] N83-29177
The wedge hot-film anemometer in supersonic flow
[NASA-TP-2134] N83-30164

SUPPORT SYSTEMS
PDSS/IMC requirements and functional specifications
[NASA-CR-170801] N83-30055

SUPPORTS
Manufacturing and cost analyses of heliostats based on the second-generation heliostat-development study
[DE83-006664] N83-29835

SUPPRESSORS
Data transmission systems
[AD-A126168] N83-29584

SURFACE FINISHING
Current density in cathode spots in the condensed discharge
[AD-A126221] N83-29601
Effects of surface preparation on the properties of single crystal CdTe junctions N83-30266

SURFACE NAVIGATION
Navigation: National plans; NAVSTAR-GPS; Laser gyros
[AD-A125533] N83-29194

SURFACE PROPERTIES
Spray impaction, retention and adhesion: An introduction to basis characteristics
[CA-8215] N83-29394
Importance of active sites for char gasification in oxygen (air) and carbon dioxide
[PB83-173393] N83-29445
Current density in cathode spots in the condensed discharge
[AD-A126221] N83-29601

Quantum dynamical model for laser excitation of a two-level adatom: Surface-dressed Bloch equations [AD-A126201] N83-29696
Czechoslovak Journal of Physics (selected articles) [AD-A126183] N83-30162
SURFACE REACTIONS
Chemical modification of carbon electrodes [AD-A125964] N83-29327
Theory of reactions at a solid surface [AD-A126202] N83-29697
Spectroscopic studies of the electronic structure of metal-semiconductor and vacuum-semiconductor interfaces [AD-A125621] N83-30272
SURFACE ROUGHNESS
Structure and properties of nickel-boron-layers [BMFT-FB-T-82-241] N83-29374
On the stress-shear relation near a turbulent air-sea interface [AD-A126252] N83-29952
SURFACE ROUGHNESS EFFECTS
Wave scattering by random surfaces and application to natural surfaces N83-29497
Numerical calculations of space-harmonic and full-wave scattering models N83-29534
Generalized approach to radio wave scatter from time-varying rough surfaces N83-29537
SURFACE TEMPERATURE
Fuel fire tests of selected assemblies [AD-A125820] N83-29450
Influence of surface type on the brightness temperature of snow-covered terrain --- satellite observation N83-29532
Soil temperature investigations using satellite acquired thermal-infrared data in semi-arid regions --- Utah [E83-10355] N83-29753
SURFACE WATER
Derivation of catchment average unit hydrograph [PB83-164574] N83-29797
Water resources data for Puerto Rico, 1979-1980 [PB83-159483] N83-29802
SURFACE WAVES
Propagation properties of surface-wave modes in a quasi-multimode, uniaxially anisotropic, graded-index optical waveguide with circularly cylindrical symmetry [PB83-165167] N83-30235
SURGES
Spicules and surges. Part 1: Examination of two possible models [NASA-CR-172778] N83-30347
SURVEILLANCE
Defense against space weapons [AD-A126159] N83-29279
A distributed network supporting ocean surveillance [AD-A125559] N83-29954
SURVEYS
FCSC (Federal Conversion Support Center) conversion tools survey [PB83-172635] N83-30047
SURVIVAL
Effect of cordiamine and mesatone on ECG under conditions of acute microwave irradiation N83-29977
SUSPENDING (MIXING)
Venturi design for metering solids flow in gas-solids suspensions [DE83-004314] N83-29660
SWEDEN
Organic geochemistry of deep ground waters --- Washington state and Sweden [DE83-005333] N83-29787
SWELLING
Candidate species selection and controlled environment injuries N83-30023
SWEPT WINGS
An experimental investigation of the subcritical and supercritical flow about a swept semispan wing [NASA-TM-84367] N83-29634
SWINE
Domestic swine in physiological research. Part 4: A blood acid-base curve nomogram for immature pigs [AD-A126081] N83-29971
SWITCHES
Basic studies of gases for fast switches [AD-A126343] N83-29618
Vacuum inductive store/pulse compression experiments on a high power accelerator using plasma opening switches [AD-A126268] N83-30176
SWITCHING CIRCUITS
Spacecraft IF switch matrix for wideband service applications in 30/20 GHz communications satellite systems: Proof-of-concept model, executive summary [NASA-CR-168175] N83-29492
Steady state performance of survivable routing procedures for circuit-switched mixed-media networks [AD-A126213] N83-29610
SYMMETRY
Turbulent combustor flowfield investigation N83-29220
SYNCHRONISM
ELF (Extremely Low Frequency) PVS (Propagation Validation System) field strength measurements, January and February, 1978 [AD-A126208] N83-29577
SYNCHRONOUS SATELLITES
EHF dielectric lens antenna for Satellite Communication Systems [AD-A126214] N83-29578
SYNOPTIC METEOROLOGY
Atmospheric observations for STS-4 landing [NASA-TM-82495] N83-29923
SYNTHESIS (CHEMISTRY)
Foreign technology alert-bibliography: Ceramics, refractories and glass technology [PB83-101642] N83-29323
Gem-difluoroallyllithium: Preparation by lithium-halogen exchange and utilization in organosilicon and organic synthesis [AD-A126094] N83-29328
Metal coordination chemistry: Removal and recovery of metal compounds from heavy crude and shale oils with multidentate ligands [DE83-006912] N83-29343
Cross-linking reactions of thermally stable high performance polymers [AD-A125967] N83-29397
Synthesis and characterization of a new silicone multiblock polymer [DE82-015189] N83-29406
SYNTHETIC APERTURE RADAR
The use of synthetic aperture radar to detect and chart submerged navigation hazards [AD-A126071] N83-29567
SEASAT synthetic-aperture radar data user's manual [E83-10321] N83-29746
Application of SEASAT-1 Synthetic Aperture Radar (SAR) data to enhance and detect geological lineaments and to assist LANDSAT landcover classification mapping --- Appalachian Region, West Virginia [E83-10365] N83-29776
SYNTHETIC FUELS
Relative catalytic activity of iron containing minerals for the hydrogasification of coal [DE82-012776] N83-29337
Methanol as an alternate transportation fuel [GPO-12-626] N83-29412
US Synthetic Fuels Corporation and National Synfuels Policy [GPO-96-481] N83-29413
Synfuel from fusion: Using the tandem mirror reactor and a thermochemical cycle to produce hydrogen [DE83-005216] N83-29424
Commercial scale coal test. Volume 4: Coal fines utilization in furnace boilers [DE83-007450] N83-29433
Development of alcohol-based synthetic transportation fuels from coal-derived synthesis gases [DE83-004857] N83-29434
Commercial scale coal test. Volume 1: Selection of camp 1 coal [DE83-007436] N83-29435
Increased automobile fuel efficiency and synthetic fuels. Alternatives for reducing oil imports. Background paper 5: Water availability for synthetic fuels: An assessment of current studies [PB83-152645] N83-29437
Increased automobile fuel efficiency and synthetic fuels. Alternatives for reducing oil imports. Background paper number 3: Environmental issues of synthetic transportation fuels from coal [PB83-161851] N83-29439
Increased automobile fuel efficiency and synthetic fuels: Alternatives for reducing oil imports. Background Paper Number 4: Environmental issues of synthetic transportation fuels from coal [PB83-161919] N83-29440
Evaluation of synthetic-fuel-character effects on rich-lean stationary-gas-turbine combustion systems. Volume 1: Subscale test program [DE83-901452] N83-29715
Electrochemistry of fuel cells for transportation applications [DE82-008115] N83-29819
SYSTEM EFFECTIVENESS
Some general topics in the field of engine handling N83-29242
Pulse combustion residential water heater [PB83-167221] N83-29480
SYSTEMS ANALYSIS
The modern concept of acceleration control: Introduction to optimal command in a handling by objective structure N83-29267
SYSTEMS COMPATIBILITY
A look at engine handling aspects from aircraft flight test experience; with an outlook for future requirements N83-29245
SYSTEMS ENGINEERING
Improvements in the dynamic simulation of gas turbines N83-29264
Restructurable VLSI program [AD-A126216] N83-29611
Newman unit 1 advanced solar repowering advanced conceptual design [DE82-014899] N83-29815
CELSS system control overview N83-30019
Microcomputers in transportation. Volume 1: Selected readings [PB83-169904] N83-30048
Total System Design (TSD) methodology assessment [AD-A126101] N83-30158
SYSTEMS INTEGRATION
Role of simulation and emulation in the development of Shuttle-Centaur (STS-Centaur) [NASA-TM-83326] N83-29292
Los Alamos portable beta-ray spectrometer [DE83-007575] N83-29667
SYSTEMS SIMULATION
Development and evaluation of a Kalman-filter algorithm for terminal area navigation using sensors of moderate accuracy [NASA-TP-2035] N83-29193
Survey of missile simulation and flight mechanics facilities in NATO [AGARD-AG-279] N83-29276
Role of simulation and emulation in the development of Shuttle-Centaur (STS-Centaur) [NASA-TM-83326] N83-29292

T

TANKER AIRCRAFT
Measurements of airtanker drop conditions during firefighting operations [PB83-157883] N83-29203
TANKS (CONTAINERS)
Fluid dynamic experiment in a surface tension tank: Phase 1/Phase 2A [BMFT-FB-W-83-002] N83-29649
TANTALUM ISOTOPES
Tests of a resonance detector spectrometer for electron-volt spectroscopy [DE83-007611] N83-29666
TARGET ACQUISITION
USAF (United States Air Force) avionics master plan [AD-A125819] N83-29205
Selection of repetition frequencies for laser rangefinders [AD-A126188] N83-29695
TARGET RECOGNITION
Detection criteria for a radar using coincidence processing [AD-A126131] N83-29565
Some signal-processing issues in radar-target identification [DE83-006554] N83-29698
TARS
Characterization of tar products from rapid pyrolysis of bituminous coals [DE83-007272] N83-29346
TEA LASERS
Heterodyne detector/electronics design and alignment of a pulsed CO2 laser wind system [AD-A126264] N83-29682
TEAMS
Modeling and analysis of teams of interacting decisionmakers with bounded rationality [AD-A125582] N83-30298
TEARING MODE (PLASMAS)
Major disruptions, inverse cascades and the Strauss equations [DE82-017188] N83-30252
TECHNOLOGICAL FORECASTING
Tactical missile technologies: The European perspective [AD-A126277] N83-29295
Titanium: Past, present, and future [PB83-171132] N83-29389
TECHNOLOGY ASSESSMENT
International survey of the status of technology of critical components for coal-liquefaction processes [DE82-015236] N83-29339
Increased automobile fuel efficiency and synthetic fuels. Alternatives for reducing oil imports. Background paper number 3: Environmental issues of synthetic transportation fuels from coal [PB83-161851] N83-29439

Capability of surface-based clear-air Doppler radar for monitoring meteorological properties in elevated layers
N83-29549
Elastomeric bearings design, construction and materials
[PB83-148211] N83-29723
Innovation for maintenance technology improvements
[PB83-149450] N83-29726
Forced- and natural-convection studies on solar collectors for heating and cooling applications
[DE83-009863] N83-29841
Prediction of hurricane storm surges: A state-of-the-art survey
[PB83-163915] N83-29946
Survey of models of baryon production in e plus e minus annihilation
[PB83-166850] N83-30212
Inertial fusion: An energy-production option for the future
[DE82-019245] N83-30250
Emergency Medical Service (EMS): Rotorcraft Technology Workshop
[NASA-CR-166495] N83-30325

TECHNOLOGY TRANSFER
In-plant recycling of stainless and other specialty steelmaking wastes. Report on investigations, 1982
[PB83-157701] N83-29382
Report of the 67th National Conference on Weights and Measures 1982
[PB83-167148] N83-29473
On the use of communication concepts and techniques for remote sensing N83-29545
Remote sensing program
[E83-10304] N83-29745
Local governments LANDSAT applications program
[E83-10364] N83-29775
Scientific communication and national security
[PB83-157800] N83-30320
Research in space commercialization, technology transfer and communications
[NASA-CR-172886] N83-30326
Research in space commercialization, technology transfer and communications
[NASA-CR-172887] N83-30327

TECTONICS
SEASAT observations of lithospheric flexure seaward of trenches
[E83-10353] N83-29751
Advanced seismological research and improved yield determination
[AD-A125508] N83-29903
Plate tectonic behaviour in the east Mediterranean region to be detected by baseline variations from satellite laser ranging
[PB83-159772] N83-29920

TELEGRAPH SYSTEMS
Data transmission systems
[AD-A126168] N83-29584

TELEMETRY
Memory-based parallel data output controller
[NASA-CASE-GSC-12447-2] N83-29302

TELEOPERATORS
Teleoperator Maneuvering System (TMS) benefits assessment study. Volume 1: Executive summary
[NASA-CR-170795] N83-30034
Teleoperator maneuvering system benefits assessment, volume 2
[NASA-CR-170796] N83-30035

TELEVISION SYSTEMS
Variable acuity remote viewing system flight demonstration
[NASA-CR-170404] N83-29204

TELLURIC CURRENTS
Electromagnetic deep-probing (100-1000 kms) of the Earth's interior from artificial satellites: Constraints on the regional emplacement of crustal resources
[E83-10363] N83-29774

TEMPERATURE
The long term upper ocean study (LOTUS) cruise summary and hydrographic data report OCEANUS 119, May 1982
[AD-A125737] N83-29956
Direct observation of time-temperature-transformation curves for crystallization of ice from solutions by a homogeneous mechanism
[AD-A126044] N83-30279

TEMPERATURE CONTROL
Dilution jet experiments in compact combustor configurations N83-29218
Magnetic heat pumping
[NASA-CASE-LEW-12508-3] N83-29625
Development of the cone calorimeter, a bench scale heat release rate apparatus based on oxygen consumption
[PB83-151266] N83-29673

TEMPERATURE DEPENDENCE
Development of a solar-desiccant dehumidifier, phase 2
[DE83-005407] N83-29829
Intermediate photovoltaic system application experiment operational performance report for G. N. Wilcox Memorial Hospital, Kauai, Hawaii for October 1982, volume 6
[DE83-006415] N83-29834
Intermediate photovoltaic system application experiment operational performance report. Lovington Square Shopping Center, Lovington, New Mexico for November 1982, volume 17
[DE83-006721] N83-29849

TEMPERATURE DISTRIBUTION
Analytical modeling of operating characteristics of premixing-prevaporizing fuel-air mixing passages
N83-29209
Dilution jet experiments in compact combustor configurations N83-29218
Thermally stratified tanks
[DE83-009089] N83-29641
Performance of Living History Farm's salt-gradient solar pond
[DE83-009066] N83-29839

TEMPERATURE EFFECTS
Structure and growth process of vapor-grown carbon fibers
[NASA-TM-77046] N83-29313
Low temperature cross linking polyimides
[NASA-CASE-LEW-12876-2] N83-29392
Water release from heated concretes
[DE82-015196] N83-29457
Candidate species selection and controlled environment injuries N83-30023

TEMPERATURE GRADIENTS
Pulse combustion residential water heater
[PB83-167221] N83-29480
Dual laser optical system and method for studying fluid flow
[NASA-CASE-MFS-25315-1] N83-29680
Constant temperature and thermal gradient investigations of the near field subseabed environment: Chemical and thermodiffusional effects
[DE82-018589] N83-29958

TEMPERATURE MEASUREMENT
Assessment of the geothermal resources of Kansas. Volume 2, section 2: Appendices
[DE83-003221] N83-29786
Constant temperature and thermal gradient investigations of the near field subseabed environment: Chemical and thermodiffusional effects
[DE82-018589] N83-29958
Journal of Research of the National Bureau of Standards, volume 87, number 5, September - October 1982
[PB83-164541] N83-30305

TEMPERATURE MEASURING INSTRUMENTS
Improving the accuracy of thermocouple temperature measuring circuits --- jet engines
[PNR-90148] N83-29670
Quality of inspections utilizing infrared technology on weatherization retrofit installations
[PB83-146936] N83-30234

TEMPERATURE PROFILES
Investigation of the feasibility of temperature profiling optical diagnostics in the SSME fuel pre-burner
[NASA-CR-170799] N83-29308

TEMPORAL DISTRIBUTION
Application of the theory of boundary value problems in the analysis of a queueing modeling with paired services
[MATH-CENTRE-TRACTS-153] N83-30105
A study of the temporal and spectral characteristics of gamma ray bursts
[NASA-TM-85031] N83-30350

TENSILE STRENGTH
Microstructure and fatigue behavior of 3 nickel base eutectic composites
[AD-A125571] N83-29369
Hydrogen attack of bainitic 2 1/4 Cr-1Mo steel
[DE82-019169] N83-29370

TENSILE TESTS
Analysis of the internal point load test
[PB83-164566] N83-29919

TERMINOLOGY
Forestry information systems and terminology
[PB83-156158] N83-30315

TERNARY SYSTEMS
Liquid-vapor equilibria for ternary natural gas systems
[PB83-173419] N83-29350

TERRAIN
Interactive analysis of digital terrain elevation and surface feature data bases
[AD-A126310] N83-29784
Improved simulations of mesoscale meteorology
[AD-A125815] N83-29928
Guidance and actuation techniques for an adaptively controlled vehicle
[AD-A126296] N83-30037

TERRAIN ANALYSIS
User's instructions for the SHORTZ and LONGZ computer programs, volume 2
[PB83-146092] N83-30094

TEST FACILITIES
Vibration and aeroelastic facility
[AD-A126317] N83-29275
Flowing-electrolyte-battery testing and evaluation
[DE82-015258] N83-29861
Toxicology Information Response Center: A ten-year perspective
[DE82-017430] N83-30005

TEXAS
Utilization of LANDSAT multispectral data in geobotanical investigations: The location of ironstone gravel in the Sam Houston National Forest
[E83-10361] N83-29772
Crosbyton Solar Power Project. Volume 8: Preliminary design of 55-MWe solar-fossil hybrid electric power plant at Crosbyton, Texas
[DE83-005285] N83-29832

TEXTBOOKS
Wear particle atlas, revised
[AD-A125512] N83-29402

THEMATIC MAPPING
Remote sensing program
[E83-10304] N83-29745
Evaluation of LANDSAT-4 TM and MSS ground geometry performance without ground control
[E83-10338] N83-29749
LANDSAT-4 Scientific Characterization: Early Results Symposium
[E83-10356] N83-29754
LANDSAT-4 hightlights N83-29755
LANDSAT-4 evaluation program and scientific characterization activities N83-29756
TM report N83-29757
Spectral characterization of the LANDSAT-4 thematic mapper sensors N83-29760
Thermal band characterization of LANDSAT-4 thematic mapper N83-29761
Evaluation of the radiometric quality of the TM data using clustering and multispectral distance measures
N83-29762
Thematic mapper intraband radiometric performance
N83-29764
An evaluation of LANDSAT-4 thematic mapper data for their geometric and radiometric accuracies and their relevance to geologic mapping N83-29765
Spatial resolution estimation of LANDSAT-4 TM and MSS data N83-29766
Remote sensing investigations of wetland biomass and productivity for global biosystems research N83-29767
Agricultural land cover mapping in the context of a geographically referenced digital information system --- Carroll, Macon, and Gentry Counties, Missouri
[E83-10357] N83-29768
Application of SEASAT-1 Synthetic Aperture Radar (SAR) data to enhance and detect geological lineaments and to assist LANDSAT landcover classification mapping --- Appalachian Region, West Virginia
[E83-10365] N83-29776

THEOREM PROVING
Projections of lawless sequences
[MATH-CENTRE-TRACTS-152] N83-30104

THEOREMS
The structure of divide and conquer algorithms
[AD-A126086] N83-30124

THEORETICAL PHYSICS
Methods for two-dimensional charged-particle transport in collisionless plasmas
[DE82-014044] N83-30245

THERMAL CONDUCTIVITY
Theoretical results for starved elliptical contacts
[NASA-TM-81697] N83-29710

THERMAL CONTROL COATINGS
Creep of plasma sprayed zirconia
[NASA-CR-167868] N83-29393

THERMAL DECOMPOSITION
The adsorption and thermal decomposition of tricresylphosphate (TCP) on iron and gold
[NASA-TM-83341] N83-29311
Diffusion-flame studies of the chemical and physical mechanisms of soot formation from aromatic and substituted-aromatic fuels
[DE83-009093] N83-29334
Proceedings of the Fifth Fundamental Combustion Research Contractors Workshop
[PB83-164483] N83-29349
Kinetics of the thermal decomposition of solid PETN
[DE82-004368] N83-29425

THERMAL EXPANSION
Designing for fighter engine transients N83-29243

Non-steady gas dynamic effects in the induction domain behind a strong shock wave
[CA-8229] N83-29633
Daze fasteners
[NASA-CASE-LAR-13009-1] N83-29706

THERMAL INSULATION
Analysis of refractory fiber insulations and hot face coatings exposed to coal-oil mixture combustion products
[DE82-018210] N83-29321
Experimental polyurethane foam roof systems, part 2
[AD-A126315] N83-29453
Quality of inspections utilizing infrared technology on weatherization retrofit installations
[PB83-146936] N83-30234

THERMAL MAPPING
Use of remote sensing for land use policy formulation
[E83-10326] N83-29747
Soil temperature investigations using satellite acquired thermal-infrared data in semi-arid regions --- Utah
[E83-10355] N83-29753
Satellite freeze forecast system: Executive summary
[E83-10368] N83-29778
Satellite freeze forecast system
[E83-10369] N83-29779
Satellite freeze forecast system. System configuration definition manual
[E83-10370] N83-29780
Satellite freeze forecast system. Operating/troubleshooting manual
[E83-10371] N83-29781
Satellite freeze forecast system. System software documentation manual
[E83-10372] N83-29782

THERMAL POLLUTION
Evaluation of the radiometric quality of the TM data using clustering and multispectral distance measures
N83-29762

THERMAL RADIATION
Wave propagation in precipitation N83-29496
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172903] N83-30059

THERMAL RESISTANCE
Thermal behavior of fine-grained soils. Building science series
[PB83-164400] N83-29472
Design and development of multi-kW power electronic transformers --- for long duration space applications
[NASA-CR-168082] N83-29596

THERMAL STABILITY
Actionometry in monochromatic flash photolysis: The extinction coefficient of triplet benzophenone and quantum yield of triplet zinc tetraphenyl porphyrin
[DE83-006819] N83-29345
A solvent resistant, thermoplastic aromatic poly(imidesulfone) and process for preparing same
[NASA-CASE-LAR-12858-2] N83-29391
Low temperature cross linking polyimides
[NASA-CASE-LEW-12876-2] N83-29392
Cross-linking reactions of thermally stable high performance polymers
[AD-A125967] N83-29397
Time-dependent convection --- in microgravity
[BMFT-FB-W-83-001] N83-29648
Electronic isotope shifts muonic atoms and electron scattering
[DE82-014040] N83-30194

THERMIONIC CONVERTERS
High thermal power density heat transfer apparatus providing electrical isolation at high temperature using heat pipes
[NASA-CASE-LEW-12950-2] N83-29804

THERMIONIC DIODES
Laser-activated electrical switching characteristics of high-current, low-loss thermionic diodes
[AD-A125521] N83-29609

THERMIONIC EMISSION
Experimental studies of lateral electron transport in gallium arsenide-aluminum gallium arsenide heterostructures
[AD-A125858] N83-30275
Thermionic-emission microscopy of polycrystalline molybdenum and Mo-LaCrO-3
[DE83-006596] N83-30284

THERMISTORS
Application of thermistors to measure air flow velocities very close to surfaces
[TNO-81-016265] N83-29653

THERMITES
Feasibility of a free-standing insertable heat source
[DE82-014207] N83-29867

THERMOCHEMISTRY
Progress in studies on catalyzed gasification of wood
[DE83-009124] N83-29332
Alternative fuel technology series. Volume 2: Comparative properties of conventional and alternative fuels
[ISBN-0-902937-66-9] N83-29411
Synfuel from fusion: Using the tandem mirror reactor and a thermochemical cycle to produce hydrogen
[DE83-005216] N83-29424

THERMOCLINES
An experimental study of single media thermocline thermal-energy storage
[DE82-006769] N83-29823
Vertical sections of temperature, salinity, thermosteric anomaly, and zonal geostrophic velocity from Norpax shuttle experiment, part 3
[PB83-169961] N83-29960
Frictional secondary circulation near an upwelled thermocline
[PB83-162024] N83-29965

THERMOCOUPLES
Improving the accuracy of thermocouple temperature measuring circuits --- jet engines
[PNR-90148] N83-29670

THERMODYNAMIC EQUILIBRIUM
Structure of evaporating and combusting sprays: Measurements and predictions N83-29211

THERMODYNAMIC PROPERTIES
Improvements in the dynamic simulation of gas turbines N83-29264
Characterization of tar products from rapid pyrolysis of bituminous coals
[DE83-007272] N83-29346
Combined-cycle heat pump analysis program
[PB83-161042] N83-29483
Creation of high energy electron tails due to the modified 2-stream instability
[NASA-CR-172819] N83-30171

THERMODYNAMICS
Membrane separations in chemical processing
[PB83-165068] N83-29355
Analysis of roof snow load case studies: Uniform loads
[AD-A126330] N83-29455
Finite-element modeling of thermo-mechanical responses associated with underground coal conversion
[DE83-006748] N83-29848
Intrinsically irreversible heat engines
[DE82-015729] N83-29853
Generalized view factor techniques for treating streaming and scattering in neutral-particle transport
[DE82-014046] N83-30196
Thermodynamic consistency test procedure using orthogonal collocation and the Peng-Robinson equation of state
[DE83-007168] N83-30293

THERMOELECTRIC POWER GENERATION
Gas turbines for the production of electrical and thermal energy
[AD-A126182] N83-29239

THERMOHYDRAULICS
Numerical calculations of ultrasonic fields
[DE82-013811] N83-30169

THERMONUCLEAR REACTIONS
Neutral-particle-beam production and injection
[DE83-006966] N83-30201

THERMOPLASTIC RESINS
Epoxy thermoplastic pavement marking material: Summary of research results and revised specifications
[PB83-164848] N83-29475
Induction heating gun
[NASA-CASE-LAR-13181-1] N83-29591

THERMOPLASTICITY
A solvent resistant, thermoplastic aromatic poly(imidesulfone) and process for preparing same
[NASA-CASE-LAR-12858-2] N83-29391

THETA PINCH
Confinement and heating of high-beta plasmas with emphasis on compact toroids. Task 2: High-beta Q-machine experiment
[DE82-020341] N83-30239

THICKNESS
SEASAT observations of lithospheric flexure seaward of trenches
[E83-10353] N83-29751

THIN FILMS
Oxygen diffusion of anodic surface oxide film on titanium studied by Auger electron spectroscopy
[DE82-013653] N83-29340
Superconducting niobium thin-film gradiometer technology program
[AD-A126133] N83-29656
Experimental determination of the thin film growth mechanism N83-30267
Ferroelectric thin films for imaging and signaling techniques
[BMFT-FB-T-83-015] N83-30287
IC-components with monolithic thin layer capacitors
[BMFT-FB-T-83-049] N83-30290

THIN PLATES
Response of a layer to sinusoidal or impulsive electromagnetic excitation: Approximation of the thin plate --- Earth resource exploration N83-29548

THOMSON SCATTERING
The computer data-acquisition and control system for Thomson-scattering measurements
[DE83-008167] N83-30097

THREE DIMENSIONAL FLOW
Applications of the contravariant form of the Navier-Stokes equations
[NASA-TM-83448] N83-29179
Analytical calculation of a single jet in cross-flow and comparison with experiment N83-29219
Test facility for basic research on distortion N83-29258
Calculation of three-dimensional boundary layers on bodies at incidence
[AD-A125634] N83-29637

THREE DIMENSIONAL MOTION
Nonuniqueness in wakes and boundary layers
[UTRC83-15] N83-29630

THROTTLING
Designing for fighter engine transients N83-29243
The criteria used for assessing acceptable engine handling on UK military aircraft N83-29244
Handling combat engines: The pilots viewpoint --- Mirage 2000 aircraft N83-29247
Flight test experience on military aircraft engine handling N83-29248

THRUST AUGMENTATION
A new approach to reheat control N83-29268

THRUST CONTROL
Handling combat engines: The pilots viewpoint --- Mirage 2000 aircraft N83-29247
Deterioration in service of engine transient behaviour N83-29256
A new approach to reheat control N83-29268

TIDAL FLATS
Tidal inlet response to jetty construction
[AD-A112448] N83-29950

TIMBER IDENTIFICATION
Computer implemented land cover classification using LANDSAT MSS digital data: A cooperative research project between the National Park Service and NASA. 3: Vegetation and other land cover analysis of Shenandoah National Park
[E83-10362] N83-29773

TIMBER INVENTORY
Use of remote sensing for land use policy formulation
[E83-10326] N83-29747

TIME
Singular perturbations and time-scale methods in control theory: Survey 1976-1982
[AD-A125908] N83-30100
Time scales, coherency, and weak coupling
[AD-A125845] N83-30118
Decomposition of time scales in linear systems and Markovian decision processes
[AD-A125852] N83-30119
An O(/E/) time algorithm for computing the reliability of a class of directed networks
[PB83-167197] N83-30159
Direct observation of time-temperature-transformation curves for crystallization of ice from solutions by a homogeneous mechanism
[AD-A126044] N83-30279

TIME DEPENDENCE
Instrument for determining coincidence and elapse time between independent sources of random sequential events
[NASA-CASE-LAR-12531-1] N83-29651
Finite-difference, spectral and Galerkin methods for time-dependent problems
[NASA-CR-172149] N83-30110
Generalized view factor techniques for treating streaming and scattering in neutral-particle transport
[DE82-014046] N83-30196

TIRES
Influence from coriolis and centripetal accelerations on in-service tire vibrations
[PB83-145185] N83-29469

TISSUES (BIOLOGY)
Local use of microwave electromagnetic energy on biologically active points N83-29978
A theoretical analysis of the observed calcium anomalies concomitant with the interaction of low intensity electric fields with cerebral tissue
[AD-A126284] N83-29996

TITANIUM
Oxygen and titanium sputtering yields as determined by laser fluorescence and Auger electron spectroscopy for monolayer oxygen coverage of polycrystalline Ti
[DE83-007683] N83-29373

Titanium: Past, present, and future
[PB83-171132] N83-29386

TITANIUM COMPOUNDS
Dye laser fluorescence spectroscopy on the doublet 3 Tokamak
[DE82-017575] N83-29338

TITANIUM OXIDES
Oxygen diffusion of anodic surface oxide film on titanium studied by Auger electron spectroscopy
[DE82-013653] N83-29340

TOKAMAK DEVICES
Dye laser fluorescence spectroscopy on the doublet 3 Tokamak
[DE82-017575] N83-29338
Relativistic two-dimensional theory of RF current drive
[DE83-010250] N83-29613
Theory of current drive with lower hybrid waves
[DE82-017216] N83-30243
Physical and engineering constraints for Tokamak reactors and helical coils
[DE82-019251] N83-30247
Laser-fluorescence measurements of hydrogen and metal densities in the doublet 3 Tokamak
[DE83-008499] N83-30251
Theory of runaway-current sustainment by lower-hybrid waves
[DE82-017213] N83-30254
Preliminary conceptual design study of a suppressed-fission Tokamak hybrid
[DE83-008428] N83-30255

TOMOGRAPHY
ART and SIRT correction factors in geotomography --- algebraic reconstruction technique (ART); simultaneous iterative reconstruction technique (SIRT) N83-29539
Stability improvements in geotomographic inversion methods N83-29540
Use of a priori information for improved tomographic imaging in coded-aperture systems N83-30220

TOPOGRAPHY
SEASAT observations of lithospheric flexure seaward of trenches
[E83-10353] N83-29751
Three-dimensional perspective software for representation of digital imagery data --- Olympic National Park, Washington
[E83-10359] N83-29770

TOPOLOGY
Chained aggregation and control system design: A geometric approach
[AD-A125853] N83-30098
On the characterization of simple closed surfaces in 3-dimensional digital images
[AD-A125573] N83-30116
Quasi periodicity in local bifurcation theory
[PB83-165092] N83-30144

TORQUE
Securable bearing stress-strain indicator --- for monitoring torque on bolts incorporated in pressure vessels
[NASA-CASE-LAR-12774-1] N83-29654

TOTAL ENERGY SYSTEMS
Solar Total Energy Project summary description
[DE83-010232] N83-29842

TOWERS
Feasibility of night-sky radiation with heat pumps
[DE83-006812] N83-29850

TOXIC HAZARDS
Air pollutant production by algal cell cultures N83-30032

TOXICITY
Identification and comparative genotoxicity of polycyclic aromatic hydrocarbons and related nitrogen-containing heteroatomic species in products from coal liquefaction processes
[DE83-006939] N83-29312

TOXICOLOGY
Toxicology Information Response Center: A ten-year perspective
[DE82-017430] N83-30005

TRACE ELEMENTS
Preconcentration methods for trace element determination
[PB83-172536] N83-29351

TRACKING (POSITION)
Modeling of the Mode S tracking system in support of aircraft safety research
[NASA-CR-166486] N83-29186

TRADEOFFS
Solar assisted gas-fired absorption heat pump
[PB83-167502] N83-29477

TRAILING EDGES
Parabolized Navier-Stokes solutions of separation and trailing-edge flows
[NASA-TM-84378] N83-29635

TRAINING ANALYSIS
The bush pilot syndrome: A critical incident analysis N83-30008

TRAJECTORIES
Development and evaluation of a Kalman-filter algorithm for terminal area navigation using sensors of moderate accuracy
[NASA-TP-2035] N83-29193
Singular perturbations and time-scale methods in control theory: Survey 1976-1982
[AD-A125908] N83-30100

TRANSDUCERS
Transducer reliability in engineering research and development --- jet engine tests
[PNR-90147] N83-29669

TRANSFER FUNCTIONS
Rates of change of propagation medium transfer functions during selective fadings N83-29501

TRANSFERRING
Membrane separations in chemical processing
[PB83-165068] N83-29355

TRANSFORMATIONS (MATHEMATICS)
The inclusion principle for dynamic systems
[DE83-006412] N83-30140

TRANSFORMERS
High voltage isolation transformer
[NASA-CASE-GSC-12817-1] N83-29590
Design and development of multi-kW power electronic transformers --- for long duration space applications
[NASA-CR-168082] N83-29596

TRANSIENT RESPONSE
Some general topics in the field of engine handling N83-29242
Designing for fighter engine transients N83-29243
The criteria used for assessing acceptable engine handling on UK military aircraft N83-29244
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172903] N83-30059

TRANSIT TIME
Design of neutron streak camera for fusion diagnostics
[DE82-018393] N83-29662

TRANSITION METALS
Local defect arrays and properties of oxides
[AD-A125927] N83-29368
Spectroscopic investigations of materials for tunable infrared lasers
[AD-A125538] N83-29689

TRANSMISSION LINES
Reactively steered adaptive array using microstrip patch elements at 4 gigahertz
[AD-A126298] N83-29570
Description of STIDAS 2-D. Part 1: General system and program description --- Speech Transmission Index (STI)
[IZF-1982-29-PT-1] N83-29587
Field expedient repair of fiber optic cables
[AD-A126075] N83-30225
Fiber optics in aircraft applications
[AD-A126165] N83-30230

TRANSMISSION LOSS
Characteristics of the transmission loss apparatus at NASA Langley Research Center
[NASA-CR-172153] N83-30165

TRANSONIC FLOW
A finite difference solution for the propagation of sound in near sonic flows
[NASA-TM-84663] N83-30167

TRANSPORT AIRCRAFT
Small transport aircraft technology propeller study
[NASA-CR-186045] N83-29178
Study of an automatic trajectory following control system
[NASA-CR-166121] N83-29271
Advanced structures technology and aircraft safety
[NASA-TM-85664] N83-29733
TRAGEN: Computer program to simulate an aircraft steered to follow a specified verticle profile. User's guide
[NASA-CR-166062] N83-30062

TRANSPORT PROPERTIES
Mass and momentum turbulent transport experiments N83-29222
Methods for two-dimensional charged-particle transport in collisionless plasmas
[DE82-014044] N83-30245

TRANSPORT THEORY
SENSIT-2D: A two-dimensional cross-section sensitivity-and uncertainty-analysis code
[DE83-004479] N83-30083
The application of Monte Carlo codes to neutron dosimetry
[DE82-017635] N83-30154
Generalized view factor techniques for treating streaming and scattering in neutral-particle transport
[DE82-014046] N83-30196
Recently developed methods in neutral-particle transport calculations: Overview
[DE82-014043] N83-30197
Self-consistent electron transport in collisional plasmas
[DE82-014083] N83-30244

TRANSPORTATION
Electrochemistry of fuel cells for transportation applications
[DE82-008115] N83-29819
Microcomputers in transportation. Volume 1: Selected readings
[PB83-169904] N83-30048

TRANSPORTATION ENERGY
Methanol as an alternate transportation fuel
[GPO-12-626] N83-29412
Alternative fuel technology series. Volume 1: Alternative fuels for transport
[ISBN-0-902937-63-4] N83-29414
Increased automobile fuel efficiency and synthetic fuels: Alternatives for reducing oil imports. Background Paper Number 4: Environmental issues of synthetic transportation fuels from coal
[PB83-161919] N83-29440

TRAPPED MAGNETIC FIELDS
An inductive-store, pulsed power source
[DE82-015443] N83-30216

TRAPPED PARTICLES
Topics in plasma instabilities: Trapped-particle modes and MHD
[DE82-019194] N83-30253

TRAVELING SALESMAN PROBLEM
Spacefilling curves and routing problems in the plane
[AD-A126309] N83-30125

TRAVELING WAVE AMPLIFIERS
Study of high power L-band space transmitters for 2nd generation INMARSAT
[SCR-518(PSL-83-159)] N83-29490

TRAVELING WAVE TUBES
Study of high power L-band space transmitters for 2nd generation INMARSAT
[SCR-518(PSL-83-159)] N83-29490

TROPICAL REGIONS
Measurements of radio refractive index profiles in tropical and equatorial regions and their influence on line of sight microwave links N83-29503
Statistics of radio refractivity and atmospheric attenuation in tropical climates --- Africa N83-29505
Measurements and analysis of raindrop size distribution in south western Nigeria N83-29518

TROPICAL STORMS
Evaluation of the tropical cyclone spiral linearization technique
[AD-A126007] N83-29934

TROPOSPHERE
A comparison of radio wave and in situ observations of tropospheric turbulence and wind velocity N83-29506
Upper tropospheric structures observed with VHF radar at Arecibo N83-29507
Effect of large-scale anisotropic refractive index inhomogeneities on the strength of the coherent VHF signal component beyond the horizon N83-29557
The 1980 stratospheric-tropospheric exchange experiment
[NASA-TM-84297] N83-29924

TROPOSPHERIC SCATTERING
Upper tropospheric structures observed with VHF radar at Arecibo N83-29507

TSUNAMI WAVES
Feasibility study of mitigating tsunami hazards in the Pacific
[PB83-156885] N83-29966

TUNABLE LASERS
Spectroscopic investigations of materials for tunable infrared lasers
[AD-A125538] N83-29689
The free electron laser: A resource paper
[PB83-148931] N83-29704

TUNGSTEN
Recovery of tungsten from a hydrothermally altered deposit. Report of investigations, 1982
[PB83-157719] N83-29381

TUNING
Active tuning of rf cavities
[DE83-007126] N83-29586

TURBINE BLADES
The matrix of axial and radial plays: The present situation and perspectives --- turbojet engines N83-29253
Development of ceramic automobile turbine engine components
[BMFT-FB-T-83-025] N83-29407

TURBINE ENGINES
Designing for stability in advanced turbine engines N83-29266
Foreign technology alert-bibliography: Ceramics, refractories and glass technology
[PB83-101642] N83-29323
Considerations of technology transfer barriers in the modification of strategic superalloys for aircraft turbine engines
[NASA-TM-83395] N83-29360

TURBINES
The 10-MWe central-receiver solar-thermal pilot-plant test operation plan
[DE83-009737] N83-29843

TURBOCOMPRESSORS
Axial compressor middle stage secondary flow study
[NASA-CR-3701] N83-29174
A theory of rotating stall of multistage axial compressors
[NASA-CR-3685] N83-29175
Test facility for basic research on distortion N83-29258
Axial compressor characteristics during transients N83-29259

TURBOFAN ENGINES
Turbine tip clearance control in gas turbine engines N83-29254
Techniques for determining engine stall recovery characteristics N83-29265
Designing for stability in advanced turbine engines N83-29266

TURBOJET ENGINES
The matrix of axial and radial plays: The present situation and perspectives --- turbojet engines N83-29253
Use of composites in aero-engines
[PNR-90149] N83-29322

TURBOMACHINERY
Applications of the contravariant form of the Navier-Stokes equations
[NASA-TM-83448] N83-29179

TURBULENCE
Convective heat transfer in internal gas flows with temperature-dependent properties
[AD-A125901] N83-29640

TURBULENCE EFFECTS
Computations of emissions using a 3-D combustor program N83-29226

TURBULENT BOUNDARY LAYER
Formulation of a prototype coupled atmospheric and oceanic boundary layer model
[AD-A126000] N83-29951

TURBULENT FLOW
Structure of evaporating and combusting sprays: Measurements and predictions N83-29211
Turbulent combustor flowfield investigation N83-29220
Mass and momentum turbulent transport experiments N83-29222
Modeling of fluctuating mass flux in variable density flows N83-29224
Numerical modeling of turbulent combustion N83-29233
Proceedings of the Fifth Fundamental Combustion Research Contractors Workshop
[PB83-164483] N83-29349
Measurement of pressure-velocity correlations in turbulent reacting flows N83-29628
An experimental investigation of the subcritical and supercritical flow about a swept semispan wing
[NASA-TM-84367] N83-29634
Calculation of three-dimensional boundary layers on bodies at incidence
[AD-A125634] N83-29637
The wedge hot-film anemometer in supersonic flow
[NASA-TP-2134] N83-30164
Turbulence spectra in the noise source regions of the flow around complex surfaces
[NASA-TM-83392] N83-30168

TURBULENT JETS
Effect of liquid droplets on turbulence structure in a round gaseous jet N83-29215

TURBULENT MIXING
Influence of a large free stream disturbance level on dynamics of a jet in a cross flow N83-29217

TWO DIMENSIONAL FLOW
Analytical modeling of operating characteristics of premixing-prevaporizing fuel-air mixing passages N83-29209
Flux-based acceleration of the Euler equations
[NASA-TM-83453] N83-30113
The influence of the deviation from the equilibrium deuteron distribution on the neutron spectra in linear pinch geometries
[IPF-82-10] N83-30260

TWO PHASE FLOW
Proceedings of the Fifth Fundamental Combustion Research Contractors Workshop
[PB83-164483] N83-29349
Gas/liquid separation in transient flow preproject
[PB83-171041] N83-29352
A contribution to the numerical description of rotating two phase flow --- computer code development, gas-liquid flow
[WTHD-153] N83-29647

U

U.S.S.R. SPACE PROGRAM
USSR-India cooperative space programs N83-29288
Contribution of space program to national economy N83-29289

UH-1 HELICOPTER
Adaptation of pultrusion to the manufacture of helicopter components
[AD-A126291] N83-29171

ULTRAHIGH FREQUENCIES
Study of high power L-band space transmitters for 2nd generation INMARSAT
[SCR-518(PSL-83-159)] N83-29490

ULTRASONIC RADIATION
Characterization of material flaws using ultrasonic ramp responses
[DE83-006123] N83-29727
Numerical calculations of ultrasonic fields
[DE82-013811] N83-30169

ULTRASONIC SCANNERS
Ultrasonic imaging development
[PB83-155994] N83-30007

ULTRAVIOLET ASTRONOMY
Detailed observations of NGC 4151 with IUE (International Ultraviolet Explorer). Paper 2: Variability of the continuum from 1978 February to 1980 May, including X-ray and optical observations
[PB83-164947] N83-30338

ULTRAVIOLET RADIATION
Investigations of vacuum ultraviolet and soft X-ray lasers
[AD-A125558] N83-29690

ULTRAVIOLET SPECTRA
First three years of IUE (International Ultraviolet Explorer satellite)
[PB83-166496] N83-30337

UNDERGROUND EXPLOSIONS
Seismological discrimination and yield determination research
[AD-A126002] N83-29896

UNDERGROUND STORAGE
Incorporation of high level wastes in SYNROC: Results from recent process engineering studies at Lawrence Livermore National Laboratory
[DE82-013402] N83-30214
Hanford solid-waste handling facility strategy
[DE82-017163] N83-30215

UNDERGROUND STRUCTURES
Finite-element modeling of thermo-mechanical responses associated with underground coal conversion
[DE83-006748] N83-29848

UNDERWATER ACOUSTICS
Computation of propagation speed and reflection of axially symmetric waves in composite cylinders with application to impedance tube and calibrator
[AD-A125875] N83-29320

UNDERWATER COMMUNICATION
ELF PVS field strength measurements, April 1977
[AD-A126212] N83-29574

UNDERWATER VEHICLES
Computer simulation and control of underwater vehicles
[PB83-150532] N83-29462

UNIFIED FIELD THEORY
Higgs mass scales and matter-anti-matter oscillations in grand unified theories
[DE82-017638] N83-30294

UNITS OF MEASUREMENT
Report of the 67th National Conference on Weights and Measures 1982
[PB83-167148] N83-29473

UNIVERSITIES
Scientific communication and national security
[PB83-157800] N83-30320

UNIVERSITY PROGRAM
Remote sensing program
[E83-10304] N83-29745
Use of remote sensing for land use policy formulation
[E83-10326] N83-29747

UNMANNED SPACECRAFT
Robots on Venus N83-29283

UNSTEADY FLOW
Unsteady flow effects in combustor systems N83-29232

UPLINKING
Angle of arrival estimation
[AD-A126038] N83-29571

UPPER ATMOSPHERE
Capability of surface-based clear-air Doppler radar for monitoring meteorological properties in elevated layers N83-29549

UPWELLING WATER
Frictional secondary circulation near an upwelled thermocline
[PB83-162024] N83-29965

URANIUM
Hydrogeochemical and stream sediment reconnaissance basic data for Bangor and Bath quadrangles, Maine
[DE83-005630] N83-29788
Calculation of unsaturated hydraulic conductivity
[DE82-016325] N83-29876
Application of NURE data to the study of crystalline rocks in the Wyoming uranium province
[DE83-008323] N83-29914

URANIUM ISOTOPES
Lasers in chemical processing
[DE82-016134] N83-29700

URANIUM OXIDES
Effects of uranium oxides on some of the algae native to Eglin Air Force Base, Florida
[AD-A125478] N83-29970

URANIUM 233
Preliminary conceptual design study of a suppressed-fission Tokamak hybrid
[DE83-008428] N83-30255

URBAN PLANNING
LANDSAT-4 hightlights N83-29755
Local governments LANDSAT applications program
[E83-10364] N83-29775

URBAN RESEARCH
Remote sensing program
[E83-10304] N83-29745
The 1980 land cover for the Puget Sound region
[E83-10360] N83-29771

URINE
To produce nutrients for plant growth N83-30027

USER MANUALS (COMPUTER PROGRAMS)
Satellite freeze forecast system. System configuration definition manual
[E83-10370] N83-29780
Satellite freeze forecast system. Operating/troubleshooting manual
[E83-10371] N83-29781
Satellite freeze forecast system. System software documentation manual
[E83-10372] N83-29782
Generalized monitoring facility. Users manual, change 4: Computer system manual
[AD-A126234] N83-30068
Generalized monitoring facility. Users manual, change 5: Computer system manual
[AD-A126235] N83-30069
FDAS EPROM programming manual
[DE82-019229] N83-30085
User's instructions for the SHORTZ and LONGZ computer programs, volume 1
[PB83-146100] N83-30093
User's instructions for the SHORTZ and LONGZ computer programs, volume 2
[PB83-146092] N83-30094

USER REQUIREMENTS
Commercial scale coal test. Volume 4: Coal fines utilization in furnace boilers
[DE83-007450] N83-29433
Multiaccess of a slotted channel using a control mini-slot
[AD-A125569UVA-525634/EE82/106] N83-29562
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172901] N83-30057

UTAH
Soil temperature investigations using satellite acquired thermal-infrared data in semi-arid regions --- Utah
[E83-10355] N83-29753
Evaluation of low-temperature geothermal potential in Cache Valley, Utah
[DE83-001219] N83-29790

UTILITIES
Newman unit 1 advanced solar repowering
[DE82-014898] N83-29816
Evaluation of the ORNL residential energy-use model
[DE82-905768] N83-29820
Fixed-base flywheel storage systems for electric-utility applications: An assessment of economic viability and R and D priorities
[DE83-007171] N83-29827

An assessment of second-generation compressed-air energy-storage concepts
[DE82-019513] N83-29859

V

V/STOL AIRCRAFT
V/STOL fountain force coefficient
[AD-A126261] N83-29200
VACANCIES (CRYSTAL DEFECTS)
Grain-boudary-diffusion mechanisms in metals
[DE82-018814] N83-30280
VACUUM
Investigations of vacuum ultraviolet and soft X-ray lasers
[AD-A125558] N83-29690
VACUUM APPARATUS
Method and apparatus for supercooling and solidifying substances
[NASA-CASE-MFS-25242-1] N83-29650
Vacuum inductive store/pulse compression experiments on a high power accelerator using plasma opening switches
[AD-A126268] N83-30176
VACUUM CHAMBERS
IC-components with monolithic thin layer capacitors
[BMFT-FB-T-83-049] N83-30290
VACUUM FURNACES
Hanford solid-waste handling facility strategy
[DE82-017163] N83-30215
VAPOR DEPOSITION
Microelectronic position sensors
[BMFT-FB-T-83-034] N83-29375
VAPOR PHASES
Development of alcohol-based synthetic transportation fuels from coal-derived synthesis gases
[DE83-004857] N83-29434
VAPORIZING
Fuel vaporization effects N83-29214
Gas/liquid separation in transient flow preproject
[PB83-171041] N83-29352
VARIABLE STARS
Einstein X-ray observations of cataclysmic variables
[DE82-015804] N83-30352
VARIANCE (STATISTICS)
Journal of Research of the National Bureau of Standards, volume 87, number 5, September - October 1982
[PB83-164541] N83-30305
VARIATIONAL PRINCIPLES
The development and testing of a stochastic variational principle for electromagnetic scattering N83-29535
Theories of nutation and polar motion III
[AD-A126289] N83-29902
VECTORS (MATHEMATICS)
Selection of repetition frequencies for laser rangefinders
[AD-A126188] N83-29695
Higgs mass scales and matter-anti-matter oscillations in grand unified theories
[DE82-017638] N83-30294
VEGETATION
Computer implemented land cover classification using LANDSAT MSS digital data: A cooperative research project between the National Park Service and NASA. 3: Vegetation and other land cover analysis of Shenandoah National Park
[E83-10362] N83-29773
Vegetational analysis of a canyon ecosystem at Los Alamos
[DE83-008277] N83-29878
Monitoring biotransformation and biodegradation of xenobiotics in simulated aquatic microenvironmental systems
[PB83-153718] N83-29883
VEHICLE WHEELS
Noise test-resilient wheels Massachusetts Bay Transportation Authority green line
[PB83-148635] N83-30329
VELOCITY
Selection of repetition frequencies for laser rangefinders
[AD-A126188] N83-29695
Brain responses and information processing 3: Hemispheric asymmetry in event related potentials and performance during discrimination of line orientation and velocity of motion
[AD-A125681] N83-30011
VELOCITY DISTRIBUTION
Applications of the contravariant form of the Navier-Stokes equations
[NASA-TM-83448] N83-29179
Analytical modeling of operating characteristics of premixing-prevaporizing fuel-air mixing passages N83-29209
Fuel spray diagnostics N83-29212
Dilution jet experiments in compact combustor configurations N83-29218
Studying electron distributions using the time-resolved free-bound spectra from coronal plasmas
[DE83-006569] N83-30241
VELOCITY MEASUREMENT
Velocity visualization in gaseous flows N83-29223
Measurement of pressure-velocity correlations in turbulent reacting flows N83-29628
Optically Recording Velocity Interferometer System (ORVIS) for subnanosecond particle-velocity measurements in shock waves
[DE82-017621] N83-29659
VENERA SATELLITES
Robots on Venus N83-29283
VENTILATION
Proceedings of the AGARD Fluid Dynamics Specialists Meeting on Wall Interference in Wind Tunnels
[AGARD-AR-190] N83-29277
Warm air systems. Part 1: Temperatures and temperature efficiencies
[PB83-148908] N83-29484
Warm air systems. Part 2: Tracer gas measurements and ventilation efficiencies
[PB83-148916] N83-29485
VENTURI TUBES
Venturi design for metering solids flow in gas-solids suspensions
[DE83-004314] N83-29660
VENUS (PLANET)
Planetary atmospheres program
[NASA-CR-172879] N83-30339
Pioneer Venus
[NASA-SP-461] N83-30340
VENUS ATMOSPHERE
Infrared radiation and inversion population of CO2 laser levels in Venusian and Martian atmospheres
[NASA-TM-85057] N83-30341
Reconstruction of the H2O profile from the results of modeling the heat flux in the lower atmosphere of Venus
[NASA-TM-77216] N83-30343
VENUS PROBES
Robots on Venus N83-29283
VERTEBRAL COLUMN
Some vibration data on primates implanted with accelerometers on the upper and lower spine: Methodology and results in Rhesus monkeys
[AD-A125545] N83-29969
VERTICAL AIR CURRENTS
Accuracy, reproducibility and vertical resolution of data from radiosondes
[NASA-TM-76949] N83-29925
VERTICAL DISTRIBUTION
Vertical sections of temperature, salinity, thermosteric anomaly, and zonal geostrophic velocity from Norpax shuttle experiment, part 3
[PB83-169961] N83-29960
Reconstruction of the H2O profile from the results of modeling the heat flux in the lower atmosphere of Venus
[NASA-TM-77216] N83-30343
VERTICAL TAKEOFF AIRCRAFT
V/STOL fountain force coefficient
[AD-A126261] N83-29200
VERY HIGH FREQUENCIES
Effect of large-scale anisotropic refractive index inhomogeneities on the strength of the coherent VHF signal component beyond the horizon N83-29557
VERY LARGE SCALE INTEGRATION
Joint Services Electronics Program, Stanford University
[AD-A126140] N83-29602
Large-scale circuit simulation
[AD-A125941] N83-29607
A critique and an appraisal of VLSI models of computation
[AD-A125835] N83-30117
VHF OMNIRANGE NAVIGATION
LORAN-C nonprecision approaches in the northeast corridor
[FAA-RD-82-78] N83-29192
VIBRATION
Influence from coriolis and centripetal accelerations on in-service tire vibrations
[PB83-145185] N83-29469
Noise test-resilient wheels Massachusetts Bay Transportation Authority green line
[PB83-148635] N83-30329
VIBRATION DAMPING
Development of monofilar rotor hub vibration absorber
[NASA-CR-166088] N83-29272
Vibration measurement and attenuation for Spacelab experiments of the D1 mission
[BMFT-FB-W-83-003] N83-29301
VIBRATION MEASUREMENT
Some vibration data on primates implanted with accelerometers on the upper and lower spine: Methodology and results in Rhesus monkeys
[AD-A125545] N83-29969
VIEW EFFECTS
Generalized view factor techniques for treating streaming and scattering in neutral-particle transport
[DE82-014046] N83-30196
VINYL POLYMERS
Porous polymers as adsorbent for mustard gas
[PML-1981-46] N83-29389
Dynamic-pressure measurements using an electronically scanned pressure module
[NASA-TM-84650] N83-29655
Applications of ethylene vinyl acetate as an encapsulation material for terrestrial photovoltaic modules
[NASA-CR-172862] N83-29809
VINYL RADICAL
Chemical modification of carbon electrodes
[AD-A125964] N83-29327
VIRGINIA
Computer implemented land cover classification using LANDSAT MSS digital data: A cooperative research project between the National Park Service and NASA. 3: Vegetation and other land cover analysis of Shenandoah National Park
[E83-10362] N83-29773
VIRUSES
Molecular biology of environmental aromatic hydrocarbons
[DE82-016978] N83-29875
VISCOELASTICITY
Latex improvement of recycled asphalt pavement
[PB83-152694] N83-29460
VISCOSITY
Commercial scale coal test. Volume 1: Selection of camp 1 coal
[DE83-007436] N83-29435
Non-steady gas dynamic effects in the induction domain behind a strong shock wave
[CA-8229] N83-29633
VISCOUS FLOW
Parabolized Navier-Stokes solutions of separation and trailing-edge flows
[NASA-TM-84378] N83-29635
VISCOUS FLUIDS
Flow in a partially filled rotating cylinder --- as applied to gas centrifuges utilized for isotope separation
[DE82-018309] N83-29644
VISIBILITY
Some new practical models for visibility for German locations where no records exist
[AD-A126339] N83-29936
Spatial and temporal visual masking and visibility
[AD-A125696] N83-30000
VISION
Understanding objects, features and backgrounds
[AD-A125514] N83-30013
VISUAL ACUITY
Variable acuity remote viewing system flight demonstration
[NASA-CR-170404] N83-29204
VISUAL DISCRIMINATION
Spatial and temporal visual masking and visibility
[AD-A125696] N83-30000
VISUAL FIELDS
A clinical psychological study of inverted visual field by inversing prisms
[AD-A126220] N83-30010
VISUAL PERCEPTION
Brain responses and information processing 3: Hemispheric asymmetry in event related potentials and performance during discrimination of line orientation and velocity of motion
[AD-A125681] N83-30011
Understanding objects, features and backgrounds
[AD-A125514] N83-30013
VISUAL STIMULI
Brain responses and information processing 3: Hemispheric asymmetry in event related potentials and performance during discrimination of line orientation and velocity of motion
[AD-A125681] N83-30011
VLASOV EQUATIONS
Numerical solution of plasma wave phenomena
[IPF-82-8] N83-30258
VOICE COMMUNICATION
Voice-communication testing using naive and experienced communicators
[AD-A126109] N83-29568
Description of STIDAS 2-D. Part 1: General system and program description --- Speech Transmission Index (STI)
[IZF-1982-29-PT-1] N83-29587

Voice control of an unmanned submersible
[AD-A125523] N83-30039

VORTEX BREAKDOWN
Numerical simulation of vortex breakdown by the vortex-filament method
[NASA-TM-84334] N83-29636

VORTEX SHEDDING
A numerical study of Strake aerodynamics
[AD-A125882] N83-29182

VORTICES
Convergence characteristics of nonlinear vortex-lattice methods for configuration aerodynamics
[NASA-TM-84371] N83-29181
Unsteady flow effects in combustor systems
N83-29232
Large-scale separation and wake closure/reattachment. The cascade problem
[UTRC83-13] N83-29629

VORTICITY
A continuous vorticity panel method for the prediction of steady aerodynamic loads on lifting surfaces
N83-29172
Nonuniqueness in wakes and boundary layers
[UTRC83-15] N83-29630

VOYAGER 2 SPACECRAFT
Currents in Saturn's magnetosphere
[NASA-TM-85055] N83-30345

W

WALKING
Guidance and actuation techniques for an adaptively controlled vehicle
[AD-A126296] N83-30037

WALKING MACHINES
Guidance and actuation techniques for an adaptively controlled vehicle
[AD-A126296] N83-30037

WALL FLOW
Application of thermistors to measure air flow velocities very close to surfaces
[TNO-81-016265] N83-29653

WALLS
States of the art and practice in the optimum seismic design and analytical response prediction of r/c frame-wall structures
[PB83-147736] N83-29465
Blast attenuation in a shot tunnel using water jets
[DE82-018508] N83-29646

WARNING SYSTEMS
Defense against space weapons
[AD-A126159] N83-29279
Detection criteria for a radar using coincidence processing
[AD-A126131] N83-29565
Feasibility study of mitigating tsunami hazards in the Pacific
[PB83-156885] N83-29966

WASHINGTON
The 1980 land cover for the Puget Sound region
[E83-10360] N83-29771
Sensing systems for measuring mechanical properties in ground masses. Volume 4: Static penetrometer
[PB83-155978] N83-29794

WASTE DISPOSAL
Executive committee report: Geotechnical instrumentation working group meeting
[DE82-012837] N83-29664
A perspective on the role of microcosms in environmental fate and effects assessments
[PB83-165530] N83-29889
Incorporation of high level wastes in SYNROC: Results from recent process engineering studies at Lawrence Livermore National Laboratory
[DE82-013402] N83-30214
Analysis, scale modeling, and full-scale tests of low-level nuclear-waste-drum response to accident environments
[DE83-007587] N83-30217
Commercial high-level-waste management: Options and economics. A comparative analysis of the ceramic and glass waste forms
[DE83-006235] N83-30218
A process for locating shallow land-burial sites for low level radioactive waste
[DE83-008173] N83-30219

WASTE TREATMENT
Water-hyacinth production primary and advanced treatment of wastewater
[DE83-006033] N83-29880
Advanced biological treatment of municipal wastewater through aquaculture
[PB83-159319] N83-29882
Controlled Ecological Life Support System. First Principal Investigators Meeting
[NASA-CP-2247] N83-30016
Generic waste management requirements for a Controlled Ecological Life Support System (CELSS)
N83-30029
Wet oxidation as a waste treatment method in closed systems N83-30030
Some issues in comparability of results and analytical methodology in CELSS waste processing research
N83-30031

WASTE UTILIZATION
In-plant recycling of stainless and other specialty steelmaking wastes. Report on investigations, 1982
[PB83-157701] N83-29382
Methanol from landfill gas: Technology and economics
[PB83-169144] N83-29443

WASTE WATER
Water-hyacinth production primary and advanced treatment of wastewater
[DE83-006033] N83-29880
Advanced biological treatment of municipal wastewater through aquaculture
[PB83-159319] N83-29882
Environmental assessment data base for petroleum refining wastewaters and residuals
[PB83-164749] N83-30316

WATER
Water penetration photogrammetry. Volume 1: Feasibility and evaluation study
[AD-A126209] N83-29291
Countercurrent reverse osmosis for ethanol-water separation
[DE83-009725] N83-29333
Water release from heated concretes
[DE82-015196] N83-29457
Newman unit 1 advanced solar repowering
[DE82-014898] N83-29816

WATER BALANCE
Continuing design work for the Sierra Cooperative Pilot Project
[PB83-164236] N83-29945

WATER DEPTH
A numerical model for wind-wave prediction in deep water
[AD-A125985] N83-29957

WATER HEATING
Corrosion control: Why the laboratory needs to be involved
[PB83-152009] N83-29380
Solar assisted gas-fired absorption heat pump
[PB83-167502] N83-29477
Pulse combustion residential water heater
[PB83-167221] N83-29480
Measured performance results: Low-cost solar water heating systems in the San Luis Valley
[DE83-006488] N83-29831
Solar energy system performance evaluation. Scottsdale Courthouse, Scottsdale, Arizona, March, April, July, August, and October 1981 through February 1982
[DE82-019030] N83-29854

WATER MANAGEMENT
Corrosion control: Why the laboratory needs to be involved
[PB83-152009] N83-29380
Increased automobile fuel efficiency and synthetic fuels. Alternatives for reducing oil imports. Background paper 5: Water availability for synthetic fuels: An assessment of current studies
[PB83-152645] N83-29437

WATER QUALITY
Preconcentration methods for trace element determination
[PB83-172536] N83-29351
Ground water quality in southeastern Minnesota
[PB83-154377] N83-29800
Water resources data for Puerto Rico, 1979-1980
[PB83-159483] N83-29802

WATER RESOURCES
LANDSAT-4 highlights N83-29755
Water resources data for Puerto Rico, 1979-1980
[PB83-159483] N83-29802
Adequacy of disinfection for control of newly recognized waterborne pathogens
[PB83-152161] N83-29884

WATER TEMPERATURE
Evaluation of low-temperature geothermal potential in Cache Valley, Utah
[DE83-001219] N83-29790

WATER TREATMENT
Corrosion control: Why the laboratory needs to be involved
[PB83-152009] N83-29380
Compact flocculation system with sludge and separators and thickeners at the Langenau Waterworks. Development and construction of a high-capacity flocculation system
[BMFT-FB-T-83-037] N83-29459

WATER VAPOR
Mesospheric water vapor measured with an airborne sensor N83-29531
Comparison of two methods for estimating the water vapor correction to altimeter readings from radiometric measurements N83-29541
Geodetic distance measuring apparatus
[NASA-CASE-GSC-12609-2] N83-29681
The 1980 stratospheric-tropospheric exchange experiment
[NASA-TM-84297] N83-29924
Satellite moisture retrieval techniques. Volume 1: Technique development and evaluation
[AD-A126245] N83-29933
Reconstruction of the H2O profile from the results of modeling the heat flux in the lower atmosphere of Venus
[NASA-TM-77216] N83-30343

WATER WAVES
A numerical model for wind-wave prediction in deep water
[AD-A125985] N83-29957

WAVE DIFFRACTION
Wave scattering by random surfaces and application to natural surfaces N83-29497

WAVE EQUATIONS
Ionizing potential waves in preionized gases
[AD-A126286] N83-30179

WAVE FRONTS
Performance of laser beam wavefront sensor
[AD-A125432] N83-29691

WAVE FUNCTIONS
Folding models for elastic and inelastic scattering
[DE82-013458] N83-30189

WAVE GENERATION
High-power generation of microwave and infrared radiation
[AD-A125953] N83-30161

WAVE INTERACTION
Wave propagation in precipitation N83-29496
The interaction of short-wavelength internal waves with a background current
[AD-A125822] N83-29581

WAVE PROPAGATION
Computation of propagation speed and reflection of axially symmetric waves in composite cylinders with application to impedance tube and calibrator
[AD-A125875] N83-29320
Wave propagation and remote sensing --- conferences
[ESA-SP-194] N83-29494
Wave propagation and remote sensing N83-29495
Wave propagation in precipitation N83-29496
Wave scattering by random surfaces and application to natural surfaces N83-29497
The PACEM experiment on line of sight multipath propagation --- propagation in clear air and meteorology (PACEM) N83-29499
Rates of change of propagation medium transfer functions during selective fadings N83-29501
Propagation anomalies in a 4.7 and 11 GHz line of sight path N83-29504
Results obtained from attenuation measurements of the Deutsche Bundespost OTS propagation experiment
N83-29510
First global results of the European Space Agency OTS propagation campaign N83-29511
Correlation between various radioelectrical data at 11.4, 11.6, and 35 GHz --- OTS and radiometer data
N83-29513
Some X-band measurements of the dielectric constant of dust N83-29514
Measurements of the complex refractive index of soils and airborne particles N83-29515
Effects of dust/sandstorm on some aspects of microwave propagation N83-29516
Experimental study of propagation characteristics in millimeter wave region N83-29517
Theoretical and experimental investigation of propagation attenuation by equatorial and tropical precipitation N83-29519
Rain rate profile effects on radiowave attenuation above 10 GHz N83-29520
Statistics on the fine scale structure of rain in Stockholm, 1977-1979 N83-29521
One-hundred GHz open-resonator measurements of artificial precipitation and fog propagation parameters
N83-29522
The interaction of short-wavelength internal waves with a background current
[AD-A125822] N83-29581
Non-steady gas dynamic effects in the induction domain behind a strong shock wave
[CA-8229] N83-29633
Characterization of material flaws using ultrasonic ramp responses
[DE83-006123] N83-29727

On the stress-shear relation near a turbulent air-sea interface
[AD-A126252] N83-29952
Versatile three-dimensional Hamiltonian ray-tracing computer program for acoustic waves in the atmosphere
[PB83-149930] N83-30170
Multiple scattering effects on transmission through the atmosphere
[AD-A126010] N83-30226
Propagation properties of surface-wave modes in a quasi-multimode, uniaxially anisotropic, graded-index optical waveguide with circularly cylindrical symmetry
[PB83-165167] N83-30235
Theory of current drive with lower hybrid waves
[DE82-017216] N83-30243
Numerical solution of plasma wave phenomena
[IPF-82-8] N83-30258

WAVE REFLECTION
Microwave multipath from sea reflections: The Bay of Fundy N83-29500

WAVE SCATTERING
Wave scattering by random surfaces and application to natural surfaces N83-29497
Scatter of elastic waves by a thin flat elliptical inhomogeneity
[NASA-CR-3705] N83-29725

WAVEFORMS
Three phase power factor controller
[NASA-CASE-MFS-25535-2] N83-29593

WAVEGUIDES
Numerical solution of equations describing electromagnetic propagation in dielectric tube waveguides
[NPL-DITC-16/83] N83-29487
Theory of gyrotron amplifier in a tape helix loaded waveguide
[AD-A126114] N83-29603
Theory of gyrotron amplifiers in a disk or a helix loaded waveguide
[AD-A126115] N83-29604
The S-matrix and acoustic signal structure in simple and compound waveguides
[AD-A125583] N83-30129

WAVELENGTH DIVISION MULTIPLEXING
Symmetric four antenna array resolves multiple reflectors with complex spectrum analysis of multiplexed closely spaced frequency soundings N83-29555

WAVELENGTHS
Dual laser optical system and method for studying fluid flow
[NASA-CASE-MFS-25315-1] N83-29680
Grating beam combiner
[AD-A125456] N83-29692
The free electron laser: A resource paper
[PB83-148931] N83-29704

WEAK ENERGY INTERACTIONS
Some prospects for antiproton physics
[DE82-011582] N83-30199

WEAPON SYSTEMS
Flight test experience on military aircraft engine handling N83-29248

WEAPONS DELIVERY
The criteria used for assessing acceptable engine handling on UK military aircraft N83-29244
Experimental aerodynamic facilities of the Aerodynamics Research and Concepts Assistance Section
[AD-A126272] N83-29274

WEAR
The adsorption and thermal decomposition of tricresylphosphate (TCP) on iron and gold
[NASA-TM-83341] N83-29311
Wear particle atlas, revised
[AD-A125512] N83-29402
Czechoslovak Journal of Physics (selected articles)
[AD-A126183] N83-30162

WEATHER FORECASTING
Satellite freeze forecast system: Executive summary
[E83-10368] N83-29778
Satellite freeze forecast system
[E83-10369] N83-29779
Satellite freeze forecast system. System configuration definition manual
[E83-10370] N83-29780
Satellite freeze forecast system. Operating/troubleshooting manual
[E83-10371] N83-29781
Satellite freeze forecast system. System software documentation manual
[E83-10372] N83-29782
Terminal forecast reference notebook for RAF Fairford, United Kingdom
[AD-A126095] N83-29930
Terminal forecast reference notebook for Feucht AAF, Germany
[AD-A126096] N83-29931
Terminal forecast reference notebook for Katterbach AAF, Germany
[AD-A126097] N83-29932
Automated hourly weather collective from HRR data input
[PB83-167122] N83-29943
Automated Weather Information Systems (AWIS): Considerations for intra- and intersystem operations and interagency considerations in development and coordination of AWIS
[PB83-159848] N83-29949

WEATHER STATIONS
Proceedings of the WEFAX Users' Conference for National and International Users of GOES WEFAX Services
[PB83-161117] N83-29947

WEATHERING
Tri-State Synfuels project commercial scale coal test. Volume 2A: Collection and shipment mine, barge, ship and train programs
[DE83-007443] N83-29431

WEIGHT (MASS)
Designing for fighter engine transients N83-29243
Water release from heated concretes
[DE82-015196] N83-29457

WEIGHT MEASUREMENT
Water release from heated concretes
[DE82-015196] N83-29457

WEIGHTING FUNCTIONS
Reactively steered adaptive array using microstrip patch elements at 4 gigahertz
[AD-A126298] N83-29570

WELLS
Assessment of the geothermal resources of Kansas. Volume 2, section 2: Appendices
[DE83-003221] N83-29786
Ground water quality in southeastern Minnesota
[PB83-154377] N83-29800

WEST GERMANY
Terminal forecast reference notebook for Katterbach AAF, Germany
[AD-A126097] N83-29932

WETLANDS
Literature review of organic matter transport from marshes
[E83-10352] N83-29750
Remote sensing investigations of wetland biomass and productivity for global biosystems research N83-29767

WIDE ANGLE LENSES
EHF dielectric lens antenna for Satellite Communication Systems
[AD-A126214] N83-29578

WIND (METEOROLOGY)
Accuracy, reproducibility and vertical resolution of data from radiosondes
[NASA-TM-76949] N83-29925

WIND DIRECTION
Satellite observation of Great Lakes ice: 1980-81
[PB83-156877] N83-29795
Cape Canaveral, Florida range reference atmosphere 0-70 km altitude
[NASA-TM-85253] N83-29935

WIND EFFECTS
Spray impaction, retention and adhesion: An introduction to basis characteristics
[CA-8215] N83-29394

WIND SHEAR
Heterodyne detector/electronics design and alignment of a pulsed CO2 laser wind system
[AD-A126264] N83-29682
Vertical sections of temperature, salinity, thermosteric anomaly, and zonal geostrophic velocity from Norpax shuttle experiment, part 3
[PB83-169961] N83-29960

WIND TUNNEL APPARATUS
Magnetic suspension and balance systems, a selected, annotated bibliography
[NASA-TM-84661] N83-29273

WIND TUNNEL MODELS
Selection and calibration of pressure transducers for low pressure measurement (0.001 psia) in the tunnel 9 high altitude side force test (WTR 1365)
[AD-A125475] N83-29657

WIND TUNNEL TESTS
Design, construction and test of an experimental propeller in the power range 750 HP
[BMFT-FB-W-83-004] N83-29184
A look at engine handling aspects from aircraft flight test experience; with an outlook for future requirements N83-29245
Experimental aerodynamic facilities of the Aerodynamics Research and Concepts Assistance Section
[AD-A126272] N83-29274
Pressure distributions obtained on a 0.04-scale and 0.02-scale model of the Space Shuttle Orbiter's forward fuselage in the Langley continuous flow hypersonic tunnel
[NASA-TM-84630] N83-29278
Pressure altitude tests of the Army AN/MSQ-114 control terminal
[AD-A125524] N83-29572

WIND TUNNEL WALLS
Proceedings of the AGARD Fluid Dynamics Specialists Meeting on Wall Interference in Wind Tunnels
[AGARD-AR-190] N83-29277

WIND TURBINES
Mod-2 wind turbine system development. Volume 1: Executive summary
[NASA-CR-168006] N83-29812
Results of free yaw tests of the Mod-O 100 kilowatt wind turbine
[NASA-TM-83432] N83-29813
The Department of Energy (DOE) research program in structural analysis of vertical-axis wind turbines
[DE82-017072] N83-29858

WIND VELOCITY
A comparison of radio wave and in situ observations of tropospheric turbulence and wind velocity N83-29506
Satellite observation of Great Lakes ice: 1980-81
[PB83-156877] N83-29795
Automatic recognition of mesocyclones from single Doppler radar data
[AD-A125854] N83-29929
Cape Canaveral, Florida range reference atmosphere 0-70 km altitude
[NASA-TM-85253] N83-29935

WIND VELOCITY MEASUREMENT
Application of thermistors to measure air flow velocities very close to surfaces
[TNO-81-016265] N83-29653
Terminal forecast reference notebook for Feucht AAF, Germany
[AD-A126096] N83-29931

WINDOWS (INTERVALS)
Mechanical reliability of current alumina and beryllia ceramics used in microwave windows for gyrotrons
[DE83-006360] N83-29404

WINDPOWER UTILIZATION
Preliminary investigation of the characteristics of an oscillating windpowered generator — atmospheric turbulence simulation
[TNO-82-0344] N83-29803
A numerical model for wind-wave prediction in deep water
[AD-A125985] N83-29957

WINDPOWERED GENERATORS
Preliminary investigation of the characteristics of an oscillating windpowered generator — atmospheric turbulence simulation
[TNO-82-0344] N83-29803

WING FLAPS
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172904] N83-30060

WINGS
Piezoelectric deicing device
[NASA-CASE-LEW-13773-1] N83-29197

WIRE
Cutting with diamond wire: Cutting procedures and suggested uses N83-29447

WORDS (LANGUAGE)
An enhanced conversion scheme for lexicographic, multiobjective integer programs
[AD-A125527] N83-30077

WORK
The measurement of motivational style: A format modification
[AD-A125756] N83-30014

WORK FUNCTIONS
Thermionic-emission microscopy of polycrystalline molybdenum and Mo-LaCrO-3
[DE83-006596] N83-30284

X

X RAY ASTRONOMY
Globular clusters and X-ray bursters
[PR-764] N83-30333
Einstein X-ray observations of cataclysmic variables
[DE82-015804] N83-30352

X RAY DIFFRACTION
Restrained least-squares program (RESLSQ) users manual
[AD-A126171] N83-30082
Standard X-ray diffraction power patterns. Section 19: Data for 51 substances
[PB83-164962] N83-30292

X RAY SCATTERING
Phase equilibria and transition in mixtures of a homopolymer and a block copolymer. 1: Small-angle X-ray scattering study
[AD-A125818] N83-29396
X RAY SPECTRA
Time-resolved X-ray line diagnostics of laser-produced plasmas
[DE82-015165] N83-30249
X RAYS
Investigations of vacuum ultraviolet and soft X-ray lasers
[AD-A125558] N83-29690
Radiation standards and calibrations
[DE82-019748] N83-30200
X-ray imaging mirror system and method of producing the same
[NASA-CASE-NPO-15828-1] N83-30222
XENON LAMPS
An investigation of the basic characteristics of the radiation of straight xenon flash tubes
[DE82-016680] N83-29614
XI HYPERONS
Determination of the Alpha parameter for the decay of xi minus into Lambda pi minus
[PB83-164814] N83-30209

Y

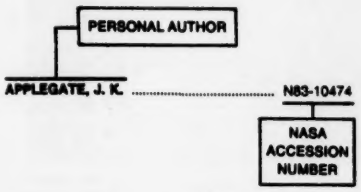
YAG LASERS
Solid-state lasers for bathymetry and communications. Studies of four rare-earth materials
[AD-A126098] N83-29683
YAW
Results of free yaw tests of the Mod-O 100 kilowatt wind turbine
[NASA-TM-83432] N83-29813
YIELD
Progress in studies on catalyzed gasification of wood
[DE83-009124] N83-29332
Seismological discrimination and yield determination research
[AD-A126002] N83-29896

Z

ZEEMAN EFFECT
Laser-fluorescence measurements of hydrogen and metal densities in the doublet 3 Tokamak
[DE83-008499] N83-30251
ZEOLITES
Process for producing oxygen
[DE83-006648] N83-29344
Development of low-cost integrated zeolite collector, supplement
[DE83-008484] N83-29840
ZETA PINCH
The influence of the deviation from the equilibrium deuteron distribution on the neutron spectra in linear pinch geometries
[IPF-82-10] N83-30260
ZINC
Flowing-electrolyte-battery testing and evaluation
[DE82-015258] N83-29861
ZINC COMPOUNDS
Present development status of Exxon's zinc-bromine battery for bulk energy storage
[DE82-013642] N83-29862
ZIRCONIUM OXIDES
Creep of plasma sprayed zirconia
[NASA-CR-167868] N83-29393

PERSONAL AUTHOR INDEX

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The NASA accession number denotes the number by which the citation is identified.

A

AARDOOM, L. N83-29920
ABARBANEL, H. D. I. N83-30161
ABBOTT, W. Y. N83-29201
ABRAM, J. M. N83-30099
ABREU, M. N83-29444
ABROKWAH, J. N83-29615
ABSHIRE, J. B. N83-29681
ABSTON, C. C. N83-29921
ABT, N. E. N83-30248
ACKERMAN, F. J. N83-30214
ACUNA, M. H. N83-30345
ADAMS, D. F. N83-29316
ADAMS, J. W. N83-29393
ADAMS, R. N83-30325
ADANT, J. M. N83-29671
AGNEW, C. E. N83-30326
N83-30327
AGRAWAL, A. N83-30159
AGTERHUIS, E. N83-29587
AJAYI, G. O. N83-29518
AKTAN, A. E. N83-29465
AL-BADER, S. J. N83-29515
ALBAUGH, J. F. N83-30215
ALBRECHTSEN, R. S. N83-30024
ALCORN, G. E. N83-30268
ALCOUFFE, R. E. N83-30197
ALIYEV, A. N83-29986
ALLEN, J. H. N83-29921
ALLEN, M. B. N83-29419
ALLIER, M. N83-29295
ALUMBAUGH, R. L. N83-29453
AMY, J. A. N83-29808
ANDERSON, D. P. N83-29402
ANDERSON, G. D. N83-29911
ANDERSON, J. R. N83-29914
ANDERSON, J. S. N83-29843
ANDERSON, O. L. N83-29209
ANDERSSON, B. V. N83-29571
ANDREASSI, J. I. N83-30011
ANGELL, C. A. N83-30279
ANGULO, C. E. P. N83-30145
ANSTETT, T. F. N83-29385
ANTAR, Y. M. M. N83-29553
ANTIPENKO, Y. N. N83-29987
ANUTA, P. E. N83-29762
N83-29766
APPLEMAN, B. R. N83-29475
ARAKI, M. N83-30140
ARNOLD, J. E. N83-29923
ARNONE, R. N83-29291
ASKEW, G. K. N83-29450
AUBRY, S. N83-30283
AUBURN, J. N. N83-29307
AUGUST, R. N83-29709
AULD, B. A. N83-29726
AURIN, G. N83-29869
AUSLANDER, D. M. N83-30019
AVERNER, M. M. N83-30018
AVRAMI, L. N83-29415
AVRAMOVIC, B. N83-30118

B

BABCOCK, W. C. N83-29333
BABRAUSKAS, V. N83-29673
BABUSKA, I. N83-30081
BACHE, T. C. N83-29896
BADIALI, J. P. N83-29367
BAEK, J. H. N83-29637
BAER, M. N83-29697
BAGHDADI, S. N83-29260
BAIN, K. R. N83-29361
BAINES, T. M. N83-29441
BAKER, E. G. N83-29332
BAKER, G. D. N83-30309
BAKER, J. N83-30085
BAKER, W. E. N83-30152
BAKHSH, H. N83-29627
BAKKER, J. T. N83-29250
BALANIS, C. A. N83-29534
N83-29539
N83-29540
BALCOMB, J. D. N83-29826
BALDWIN, R. M. N83-29331
BALES, T. T. N83-29446
BALIGH, M. M. N83-29793
BALL, W. E. N83-30158
BALLOU, E. V. N83-30033
BALLUFFI, R. W. N83-30280
BALTES, H. P. N83-29536
BANKS, B. A. N83-29197
BANNISTER, P. R. N83-29574
N83-29577
BAR-HAIM, B. N83-29180
BARBEE, J. G. N83-29359
BARBEE, T. H. N83-30222
BARBER, P. W. N83-29542
BARBROW, L. E. N83-29473
BARD, A. J. N83-30274
BARKER, J. L. N83-29756
N83-29757
N83-29760
N83-29761
BARLETT, R. H. N83-30216
BARLOW, R. S. N83-29828
BARNES, A. E. N83-30299
BARNES, C. E. N83-29866
BARROUIL, C. N83-29267
BARTHOLDI, J. J., III N83-30122
N83-30125
BARTOLUCCI, L. A. N83-29762
BASILI, P. N83-29508
BASS, B. R. N83-29739
BASSETT, M. G. N83-29917
BATES, M. N83-30072
BATES, S. C. N83-29338
BATHO, E. K. N83-29661
BATSON, R. N83-29764
BATTRICK, B. N83-29494
BATTS, G. W. N83-29926
BATTS, W. N83-29923
BAUCHSPIES, J. N83-30325
BAUDIN, F. N83-29499
BAUERFEIND, K. N83-29242
BAUM, B. N83-29809
BAZOW, S. R. N83-29683
BEAN, S. J. N83-29936
BECHER, P. F. N83-29404
BECKER, H. N83-30247
BECKER, W. S. N83-30014
BECRAFT, W. N83-29444
BEGEAL, D. R. N83-29428
BEHANNON, K. W. N83-30346
BEHRIN, E. N83-29864
BELAND, R. R. N83-30153
BELL, A. L. N83-29795
BELL, K. W. N83-30212
BELLINGER, F. O. N83-29641
BELLOWS, R. N83-29862
BELOFF, W. R. N83-29664
BELOKRINITSKIY, V. S. N83-29981
N83-29983
BENDER, L. U. N83-29765
BENNETT, B. I. N83-29354
BENNETT, J. E. N83-29914
BENNETT, J. G. N83-30139
BENSCH, J. O. N83-29201
BENSON, D. N83-30321
N83-30322
BENSUSSAN, P. L. N83-29361
BENTLEY, B. T. N83-30301
BEOTTCHER, K. I. N83-30298
BERGERON, P. W. N83-29845
BERGMANN, J. C. N83-29572
BERGSTROM, S. L. N83-29806
BERLAD, A. L. N83-29643
BERMAN, D. A. N83-29366
BERNARD, E. N. N83-29966
BERNETT, M. K. N83-29400
BERNSTEIN, I. B. N83-29684
BERSON, L. A. N83-29707
BERTALOT, L. N83-30262
BERTERO, V. V. N83-29465
N83-29470
N83-29742
BERWALD, D. N83-30255
BEZLER, P. N83-29740
BHADRA, D. K. N83-30254
BIAGI, S. F. N83-30209
BIBL, K. N83-29555
BIENKOWSKI, M. A. N83-30079
BILARDI, G. N83-30117
BILLET, J. A. N83-29944
BINDER, K. J. B. N83-30290
BINION, T. W., JR. N83-29277
BINNALL, E. N83-29664
BIRD, R. G. N83-29707
BIRGMEIER, K. N83-29674
BISNOVATYI-KOGAN, G. S. N83-30333
BJORKEN, J. D. N83-30295
BJORKLUND, J. R. N83-30093
N83-30094
BLACK, B. M. N83-29178
BLAKE, E. E. N83-29171
BLAKE, M. L. N83-30347
BLANC, J. P. C. N83-30105
BLANKENSHIP, P. E. N83-29611
BLATTENBERGER, G. R. N83-29818
BLEIWAS, D. I. N83-29385
BLOMQVIST, C. N83-29484
N83-29485
BLOOM, E. D. N83-30203
N83-30204
BLOOMQUIST, D. D. N83-29659
BLUM, L. N83-29367
BODHAINE, B. A. N83-29948
BODLE, W. W. N83-29420
BOEHME, W. N83-29743
BOGDAN, E. J. N83-30313
BOHON, H. L. N83-29732
BOKSENBERG, A. N83-30338
BOLDMAN, D. R. N83-30168
BOLDS, P. G. N83-29275
BOLLEN, W. M. N83-29694
BOND, J. D. N83-29996
BONNE, U. N83-29481
BOORMAN, D. B. N83-29797
BOOTHE, R. N83-29565
BORCHERS, I. U. N83-29184
BORGEFORS, G. N83-29791
BORGESON, W. N83-29764
BOSQUE, M. A. N83-29212
N83-29214
BOTTCHER, C. N83-30198
BOURQUIN, A. W. N83-29689
BOURQUIN, M. N83-30209
BOWERS, J. F. N83-30093
N83-30094
BOWMAN, C. K. N83-29933
BOYDEN, R. P. N83-29273
BRACCO, F. V. N83-29230
BRACKBILL, J. U. N83-30245
BRADLEY, P. F. N83-29278
BRAKE, R. J. N83-29667
BRANIK, M. N83-29376
BRAS, R. L. N83-30145

BRAUN, B. A. N83-29870
BRAUNER, K. M. N83-30092
BRESNAHAN, P. A. N83-29333
BREZONIK, P. L. N83-29888
BRIEN, M. J. N83-30329
BRIGGS, P. R. N83-29891
BRIGHT, D. C. N83-29955
BRIGHT, D. S. N83-29679
BRINKLEY, J. D. N83-29271
BRISCOE, M. G. N83-29956
BRISTOW, D. R. N83-29198
N83-29200
BRITTEN, A. J. N83-30209
BROER, H. W. N83-30144
BROERMAN, J. G. N83-30271
BROGLIA, R. A. N83-30195
BROMAGE, G. E. N83-30338
BROMBERG, L. N83-30247
BROOKS, C. W., JR. N83-29176
BROOKS, R. L. N83-29796
BROUSSARD, J. R. N83-29270
BROUTMAN, D. N83-29581
BROWN, G. V. N83-29625
BROWN, J. L. N83-29635
BROWN, J. S. N83-30009
BROWN, M. D. N83-29332
BROWN, R. M. N83-29291
N83-30209
N83-30299
BROWN, R. V. N83-30304
BROWNLIE, W. R. N83-29468
BROWNSTEIN, B. J. N83-30037
BRUNO, C. N83-29230
BRUSSAARD, G. N83-29511
N83-29526
N83-29544
BRYANT, N. A. N83-29749
BRYSON, J. W. N83-29739
BUCKLEY, J. N83-29591
BUCKNER, S. A. N83-29656
BUECHLER, M. N83-29395
BULL, E. J. N83-29244
BURCHETT, O. L. N83-29427
BURCKHART, H. N83-30209
BURGESS, E. N83-30340
BURKART-SABSOUB, M. N83-30314
BURKE, J. C. N83-29477
BURNHAM, R. L. N83-29694
BURNS, B. A. N83-29567
BURNS, K. C. N83-30150
BURRELL, K. H. N83-29338
N83-30251
BURSE, R. L. N83-29995
BUSHNELL, D. E. N83-29561
BUSTAMANTE, C. N83-29405
BUTLER, D. K. N83-29906
BUTLER, P. C. N83-29861
BUTMAN, A. B. N83-29979
BYRDSONG, T. A. N83-29176

C

CAHN, L. S. N83-29679
CALAHAN, D. A. N83-30115
N83-30127
CALVIN, M. N83-29846
CAMPBELL, E. M. N83-30232
CAMPBELL, G. S. N83-29187
N83-29188
CAMPBELL, J. H. N83-30214
CAMPBELL, W. F. N83-30024
CANESINDASILVA, W. C. N83-29915
CANT, R. S. N83-29633
CANTOS-FIGUEROIA, A. N83-29960
CANUTO, C. N83-30111
CAPSONI, C. N83-29552
N83-29554
CARDEN, J. N83-30027
N83-30031
CARMON, J. L. N83-30054
N83-30057
N83-30058
N83-30059
N83-30060
CARNAHAN, T. G. N83-29383
CARNEY, J. N83-29615
CAROVILLANO, R. L. N83-30353
CARPENTER, J. M. N83-29666
CARR, J. W. N83-30237
CARRERAS, B. A. N83-30240
CASE, J. L. N83-29467
CASTLE, K. N83-29763
CAULFIELD, H. J. N83-29606
CAUTERMAN, M. N83-29548
CEDRONE, L. N83-29943
CEKALA, C. N83-29419
CEPERLEY, D. N83-30155
CERNANSKY, N. P. N83-29213
CHADWICK, R. B. N83-29549
CHAFFEE, R. B. N83-30309
CHAN, J. W. N83-29717
CHAN, T. F. N83-30123
CHAN, V. S. N83-30243
N83-30254
CHANDRA, M. N83-29528
N83-29543
CHANG, B. C. N83-30089
CHANG, C. Y. N83-30099
CHANG, Y. M. L. N83-30234
CHAPIN, W. G. N83-29655
CHAPMAN, A. J., III N83-29732
CHARNES, A. N83-30120
N83-30157
CHARNEY, F. A. N83-29470
CHATTERJEE, A. N83-29661
CHATURVEDI, P. N83-29904
CHAVEZ, P. N83-29764
CHEN, C. H. N83-30156
CHEN, F. F. N83-30202
CHEN, G. N83-30106
CHEN, H. C. N83-30178
CHEN, J. N83-29904
CHEN, P. C. T. N83-29736
CHENY, E. W. N83-30132
CHERNS, L. N83-29917
CHERRY, J. T. N83-29895
N83-29896
N83-29903
CHERRY, S. M. N83-29463
CHERUVU, N. S. N83-29357
CHIANG, C. K. N83-29600
CHILDS, W. J. N83-29699
CHOE, J. Y. N83-29603
N83-29604
CHOLLAR, B. H. N83-29475
CHOLLET, R. N83-29972
CHORIN, A. J. N83-29233
CHOW, T. P. N83-29598
CHOW, W. W. N83-29690
CHRISSOULIDIS, D. P. N83-29537
CHRISTENSEN, C. P. N83-29694
CHRISTOPHOROU, L. G. N83-29618
CHU, Y. N83-30043
CHUA, S. N83-29897
CIBULA, W. G. N83-29772
N83-29773
CICOLANI, L. S. N83-29193
CIOTTI, P. N83-29508
N83-29533
CLARK, G. A. N83-30313
CLARK, K. H. N83-29592
CLARK, S. A. N83-30091
CLARKE, J. F. N83-29633
CLATTERBUCK, C. H. N83-29590
CLAUS, R. W. N83-29219
N83-29228
N83-29237
CLAUSS, D. B. N83-29838
CLAVEL, J. N83-30338
CLEMMONS, J. I., JR. N83-29651
COBAN, E. N83-29492
COFFEY, H. E. N83-30331
N83-30332
COGLEY, A. C. N83-30349
COHEN, J. B. N83-29364
N83-29368
COHEN, S. C. N83-29894
COHN, D. N83-30247
COHN, S. H. N83-30006
COK, D. R. N83-29699
COLAKOVIC, M. N83-29417
COLE, R. L. N83-29641
COLE, S. R. N83-29631
COLEMAN, P. J. N83-29896
COLES, M. G. H. N83-29999
COLIN, L. N83-30340
COLLINS, R. L. N83-30122
COLLINS, W. E. N83-29994
COLOMBANO, S. N83-30020
COLP, J. L. N83-29908
COMES, F. J. N83-30172
N83-30173
COMMISSO, R. J. N83-30176
COMPTON, R. N. N83-30185
CONFORTI, M. N83-30134
CONLEY, T. B. N83-29339
CONNERNEY, J. E. N83-30345
COOPER, A. M. N83-30213
COOPER, J. F. N83-29864
COOPER, W. W. N83-30157
COOPERSTEIN, B. N. N83-30141
COOPERSTEIN, G. N83-30176
CORDER, R. E. N83-29845
CORDOVA, F. A. N83-30352
CORNELIUS, W. D. N83-30231
CORNUEJOIS, G. N83-30134
CORNWALL, J. M. N83-30161
CORRIGAN, R. D. N83-29813
CORT, G. E. N83-30139
COSTA, E. N83-29524
COULBERT, C. D. N83-29809
COX, R. L. N83-29305
CRIM, F. F. N83-30180
CRISMAN, T. L. N83-29688
CROOKER, T. W. N83-29735
CROSBY, R. L. N83-29382
CROWE, C. T. N83-29660
CROWLEY, F. A. N83-29300
CSANADY, G. T. N83-29965
CUDDIHY, E. F. N83-29809
CUELLAR, J. P., JR. N83-29359
CULLINGFORD, R. E. N83-30079
CUOMO, G. N83-29569
CWYNAR, D. S. N83-29597
CYMERMAN, A. N83-29995
CZECHOWSKY, P. N83-29507

D

DAHL, T. L. N83-29339
DANIELL, R. E. N83-29901
DANNEMANN, K. A. N83-29369
DANNENBERG, R. B. N83-30096
DASARI, R. R. N83-29559
DAUD, T. N83-30269
DAUM, P. H. N83-29872
N83-29874
DAURIA, G. N83-29508
N83-29530
DAVIDSON, H. F. N83-30302
DAVIS, F. N83-29847
DAVIS, J. I. N83-29700
DAVIS, L. S. N83-30013
DAVIS, R. C. N83-29446
N83-29706
DAWOUD, M. M. N83-29515
DAWSON, L. R. N83-29866
DAY, R. L. N83-29753
DAY, S. M. N83-29896
DEADRICK, F. J. N83-29910
DEAN, J. S. N83-30071
DEAN, M. E. N83-29762
DEASON, T. R. N83-29970
DECHICHIO, D. N83-29897
DEEPAK, A. N83-29693
DEFACIO, B. N83-30137
DEFROEGE, F. N83-29961
DEGAUQUE, P. N83-29548
DELAUDER, D. M. N83-29534
DELGASS, W. N. N83-29335
DELMAS, J. N83-29267
DELOGNE, P. N83-29496
N83-29671
DELUCIA, F. C. N83-29576
DELUCIA, R. A. N83-29234
DELVIGS, P. N83-29392
DEMING, D. N83-30342
DERYDER, D. D. N83-29304
DETMAN, T. N83-29549
DEUEL, L. E. N83-29461
DEUTSCH, R. N83-30257
N83-30259
N83-30260
N83-30262
DEVAN, J. N83-30255
DEVINCENZI, D. L. N83-30041
DEVRIES, J. L. N83-29790
DEVROEGE, F. N83-29962
DEWALD, A. B. N83-29373
DEWEY, W. G. N83-30024
DHAR, A. K. N83-30210
DHEIN, N. R. N83-29503
DIATCHENKO, N. N83-30247
DINEGAR, R. H. N83-29425
DINGER, R. J. N83-29570
DINGUIRARD, M. N83-29763
DINTELMANN, F. N83-29510
DISSANAYAKE, A. W. N83-29543
DIXON, D. A. N83-30175
DOBSON, M. C. N83-29532
DODEL, G. N83-29701
DOES, R. J. M. M. N83-30147
DOHERTY, B. J. N83-29719
DOMMERMUTH, F. N83-29486
DONCHIN, E. N83-29999
DORAN, J. C. N83-29873

DORN, R. N83-30287
DORN, T. N83-29620
DORY, R. A. N83-30240
DOSWELL, C. A., III N83-29941
DOUGHERTY, J. H., JR. N83-30002
DOUGLAS, C. C. N83-30114
DOUGLAS, N. G. N83-29701
DOUPNIK, J. R. N83-30095
DOVSTAM, K. N83-29469
DOW, D. D. N83-29750
DOWSON, D. N83-29710
N83-29711
N83-29712
N83-29713
DRAKE, J. N83-29904
DRENNON, C. N83-29460
DRING, R. P. N83-29174
DRUEHL, K. N83-29690
DRUGAN, W. J. N83-29737
DUBBELDAY, P. S. N83-29320
DUCLOUX, R. N83-30235
DUDGEON, D. E. N83-29580
DUH, J. N83-29272
DUIVEN, E. M. N83-29296
DUNN, D. A. N83-30326
N83-30327
DUNN, J. C. N83-29908
DUQUETTE, D. J. N83-29369
DURHAM, I. N83-30075
DUSTIN, M. O. N83-29811
DYNIKOV, A. S. N83-29614

E

EAMES, D. R. N83-29338
N83-30251
EARLY, J. G. N83-29384
EBERIEL, D. T. N83-29422
EBRAHIM, N. A. N83-30202
EBY, J. R. N83-29771
ECKENHOFF, R. G. N83-30003
ECKHARDT, B. N83-29444
ECKHARDT, K. N83-29649
ECKSTROM, D. J. N83-30174
EDGERTON, E. S. N83-29888
EDLUND, A. N83-29881
EDLUND, V. E. N83-29379
EDWARDS, C. L. W. N83-29631
EICHHORN, H. N83-30330
EICHLER, J. N83-30286
EIDENSCHINK, R. N83-30286
EILERS, C. E. N83-30290
EILERS, D. N83-29301
EISELE, J. A. N83-29383
EISELE, K. N83-30256
EISENSTEIN, R. A. N83-30199
EL-KHAMY, S. E. N83-29538
EL-MASRY, E. I. N83-30229
EL-RAIS, G. I. N83-29538
ELAM, G. W. N83-29994
ELCHESEN, D. R. N83-30312
ELGHOBASHI, S. E. N83-29215
ELIASON, E. N83-29764
ELIEZER, S. N83-30265
ELLIOTT, R. D. N83-29945
ELLIS, D. E. N83-29368
ELLIS, D. R. N83-29235
ELLIS, K. J. N83-30006
ELLSON, R. W. N83-29939
ELVIS, M. N83-30338
ELVIUS, A. N83-30338
ELZER, A. N83-30172
N83-30173
EMBRECHTS, M. J. N83-30083
ENABNIT, D. B. N83-29964
ENDO, M. N83-29313
ENGEL, A. E. N83-29620
ENGEL, B. N83-30146
ENGL, W. L. N83-29621
ENGLAND, T. R. N83-30193
ENGQUIST, M. N83-30156
ENSMAN, R. E. N83-30237
EPSTEIN, A. H. N83-29606
ERCKMANN, V. N83-30261
ERKKILA, B. H. N83-29667
ERZ, U. N83-30258
ESFANDIARI, P. N83-30278
ESSING, D. T. N83-29495
ESTABROOK, K. G. N83-30232
EVANS, B. G. N83-29550
EVANS, D. C. N83-29616
EVANS, E. H. N83-30292
EZRA, C. E. N83-29763

F

FAETH, G. M. N83-29211
FAINTICH, M. B. N83-29784
FALK, L. N83-29521
FAN, F. R. N83-30274
FAN, H. N83-30229
FANT, K. N83-30074
FARNSWORTH, R. K. N83-29942
FARRELL, R. A. N83-29535
N83-30278
FARRIS, C. N83-29821
FAUT, O. D. N83-29311
FAVIN, S. N83-30278
FEAR, J. S. N83-29236
FEDERER, J. I. N83-29321
FEDOROV, O. S. N83-29283
FELD, M. S. N83-29559
FERBER, M. K. N83-29404
FEREBEE, M. J., JR. N83-29304
FERGUSON, G. D. N83-29683
FERNSLER, R. F. N83-30179
FERRISS, D. H. N83-29487
FICHTER, H. N83-29245
FIELD, R. W. N83-29905
FIELDER, W. L. N83-29358
FIMMEL, R. O. N83-30340
FINE, M. E. N83-29368
FINK, R. C. N83-29197
FIRESTONE, R. F. N83-29393
FISCHER, J. N83-30321
N83-30322
FISCHER, M. C. N83-29416
FISCUS, L. B. N83-29190
FISH, R. H. N83-29343
FISHER, R. W. N83-29204
FLANAGAN, P. F. N83-29278
FLEMING, P. N83-29448
FLETCHER, R. A. N83-29679
FLIPPEN-ANDERSON, J. L. N83-30082
FLOSSMANN, W. N83-29375
FLUECK, J. A. N83-29945
FLYNN, T. M. N83-29355
FOGELSON, D. J. N83-29429
FONG, F. N83-30032
FORSLUND, D. W. N83-30245
FOSKETT, R. D. N83-30097
FOSS, A. M. N83-29264
FOSS, J. J. N83-29217
FOSTER, B. N83-30212
FOUTCH, G. L. N83-29806
FOWLER, R. H. N83-30242
FOX, R. A. N83-30200
FOX, R. L. N83-29591
FOXX, T. S. N83-29878
FRANCESCONI, R. N83-29997
FRATER, J. L. N83-29709
FRAYRE, R. L. N83-30002
FREEDEN, W. N83-30121
FREELAND, K. A. N83-29539
FREEMAN, B. E. N83-29928
FREEMAN, G. W. N83-29231
FRELLER, H. N83-29375
FREULICHER, V. D. N83-29557
FRICKLAND, P. O. N83-29808
FRIEDEL, H. N83-29184
FRIEDMAN, M. L. N83-29293
FRITTS, M. J. N83-29210
FU, L. S. N83-29725
FUCHS, I. M. N83-29557
FUJITA, R. K. N83-29420
FUJIWARA, M. N83-30010
FUKUSHIMA, N. N83-29777
FULTON, D. S. N83-29325
FUNKHOUSER, E. A. N83-30032
FURGERSON, R. B. N83-29909
FURUHAMA, Y. N83-29517
FURUKAWA, T. N83-29344
FURUTA, O. N83-29529
FYFE, D. E. N83-29210

G

GALTSEV, A. P. N83-30343
GAMACHE, R. R. N83-30064
GANGULI, G. N83-29904
GANN, T. J. N83-29363
GARCIA, C. E. N83-30101
GARCIA, L. N83-30240
GARDNER, C. M. K. N83-29798
GARNER, J. N83-30255
GAROFALO, D. N83-29890
GARRETT, H. B. N83-29299
GARRETT, J. N83-29293
GATZA, P. E. N83-29416
GAYNOR, J. N83-29549
GEESAMAN, D. F. N83-30205
GELLER, P. E. N83-29542
GENENS, L. N83-29847
GEORGE, C. W. N83-29203
GEORGE, D. C. N83-30193
GEORGE, T. F. N83-29696
N83-29697
GEORGES, T. M. N83-30170
GERGELY, P. N83-29474
GERLDREICH, E. E. N83-29884
GERNER, J. N83-29623
GERSTNER, H. B. N83-30005
GESSNER, F. B. N83-29839
GETTY, D. J. N83-30036
GHANNUDI, M. A. N83-29444
GHOBRIAL, S. I. N83-29514
GHONEIM, A. F. N83-29233
GIGNAC, D. A. N83-30081
GILARDI, R. N83-30082
GILBERT, B. K. N83-30277
GILL, S. J. N83-29735
GILLETT, W. D. N83-30158
GILLORY, J. U. N83-30238
GIMMESTAD, G. G. N83-29899
GINDI, G. R. N83-30220
GIRRENS, S. P. N83-30139
GLASGOW, J. C. N83-29813
GLAZE, L. W. N83-29200
GLENN, L. A. N83-29646
GLOVER, I. A. N83-29527
GLOWNIA, J. H. N83-30183
GOETHE, H. N83-29968
GOGINENI, S. P. N83-29561
GOKA, T. N83-29186
GOLD, R. E. N83-30348
GOLDFINE, A. N83-30049
GOLDHIRSH, J. N83-29551
GOLDSTEIN, S. A. N83-30176
GOMES, J. M. N83-29381
GONDHALEKAR, P. M. N83-30337
N83-30338
GONZALEZ, E. R. N83-29819
GOODGER, E. M. N83-29411
N83-29414
GOODMAN, L. S. N83-29699
GOODWIN, D. R. N83-29885
GOOGE, W. D. N83-30330
GORBACH, I. N. N83-29976
GORDAN, A. L. N83-29292
GORDIYETS, B. F. N83-30341
GOSSARD, E. E. N83-29549
GOTHAN, G. N83-29248
GOUGH, E. C. N83-30299
GRACEY, C. M. N83-29814
GRADY, D. N83-30255
GRAHAM, A. L. N83-30139
GRANNELL, R. B. N83-29907
GRANTHAM, L. F. N83-30218
GRAUF, W. N83-30259
N83-30262
GRAY, M. M. N83-30045
GREBER, I. N83-29218
GREEN, J. L. N83-30095
GREENO, J. N83-30009
GREGORY, E. C. N83-29664
GRENS, J. Z. N83-30214
GRIFFITH, D. A. N83-29945
GRIFFITH, R. L. N83-29663
GRIFFITHS, J. M. N83-30307
N83-30308
GRIMMETT, C. A. N83-29808
GRISHIN, G. A. N83-29286
GROH, K. N83-29436
GROOTSCHOLTEN, P. A. M. N83-30270
GROSS, R. J. N83-29823
GROSVELD, F. W. N83-30165
GROT, R. A. N83-30234
GROW, G. R. N83-30250
GRUBIN, H. L. N83-30276
GRUEN, D. M. N83-29373
GUISSARD, A. N83-29541
GUON, J. N83-30218
GUPTA, A. N83-29809
GUREGHIAN, A. B. N83-29876
GUTU-NELLE, A. N83-30287
GUY, J. G. N83-30213
GYULASSY, M. N83-30184

H

HAAS, G. N83-30286
HADDAD, S. N83-29516
HADLEY, R. T. N83-30200

HAGEDORN, N. H. N83-29810
HALL, D. H. N83-29882
HALL, P. R. N83-29937
HALL, W. J. N83-29464
HALLIKAINEN, M. T. N83-29532
HAM, S. N83-29461
HAMM, L. L. N83-30293
HAMMARLING, S. J. N83-29487
HAMROCK, B. J. N83-29710
N83-29711
N83-29712
N83-29713
HANDY, W. E. N83-29865
HANNAFORD, J. F. N83-29945
HANNON, J. P. N83-29971
HANSEN, B. D., III N83-30029
HANSEN, K. R. N83-29432
HANSEN, V. N83-29547
HANSON, J. M. N83-30348
HANSON, M. E. N83-29911
HANSON, R. K. N83-29223
HARDEE, H. C. N83-29908
HARE, C. T. N83-29722
HARIHARAN, S. I. N83-30167
HARKISKY, M. N83-29767
HARR, M. E. N83-29476
HARRIS, D. J. N83-29522
HARRIS, D. L. N83-29946
HARRIS, J. H. N83-30240
HARRIS, J. M. N83-29948
HART, J. C. N83-30212
HARTMAN, D. L. N83-29479
HARTMANN, G. K. N83-29531
HARTNETT, E. B. N83-29300
HARVEY, J. N83-30091
HARVEY, R. W. N83-30254
HASTINGS, R. N83-29249
HAVAS, G. D. N83-29207
HAVERTY, J. F. N83-29563
HAWK, J. D. N83-29198
HAWS, L. D. N83-29425
HEAP, M. P. N83-29349
HEARD, H. C. N83-29912
HEBENSTREIT, G. T. N83-29966
HEELIS, R. A. N83-30095
HEFFERNAN, A. P. N83-29473
HELD, D. N. N83-29746
HELL, A. N83-29674
HENDER, T. C. N83-30240
HENDER, T. O. N83-30242
HENDERSON, J. L. N83-29947
HENDERSON, J. M. N83-29720
HENDRY, A. N83-29553
HENDRY, C. D., JR. N83-29888
HENNECKE, D. K. N83-29254
HENNINGTON, L. D. N83-29929
HENRY, M. W. N83-29278
HERBEN, M. H. A. J. N83-29506
HERBRECHTSMEIER, E. H. N83-29801
HERCOCK, R. G. N83-29257
HERMAN, G. C. N83-30143
HERMANCE, J. F. N83-29774
HERMOCH, V. N83-30162
HEROLD, H. N83-30259
N83-30260
N83-30262
HERRERO, F. A. N83-29294
HERSCHBACH, D. R. N83-30175
HERSH, D. B. N83-29482
HIEFTJE, G. M. N83-30237
HIENZ, E. N83-29245
HIGA, W. H. N83-29708
HIGLEY, W. L., JR. N83-29362
HILDENBRAND, D. L. N83-29336
HILL, A. M. N83-29845
HILL, C. K. N83-29926
HILL, D. N83-30087
HILL, H. W. N83-29539
N83-29540
HILL, J. N83-29238
HILLER, B. N83-29223
HILLIS, D. N83-29847
HIMPSEL, F. J. N83-30272
HINDS, E. A. N83-30231
HINES, A. P. N83-29354
HIRSHBERG, A. S. N83-29479
HIRSHMAN, S. P. N83-30240
HISLE, R. N83-29444
HITCHELL, M. N83-29615
HIZANIDIS, K. N83-29613
HJELMFELT, M. R. N83-29874
HJELMSTAD, J. N83-29545
HO, P. T. N83-29492
HOCK, F. N83-29301
HOCKER, G. B. N83-30224
HOELZER, C. A. N83-29269
HOENIG, C. L. N83-30214
HOFF, J. C. N83-29884
HOFF, J. E. N83-30021
HOGAN, D. B. N83-29933
HOGAN, M. N83-30148
HOGAN, R. T. N83-30200
HOKIN, S. A. N83-30242
HOLBROOK, K. L. N83-30200
HOLDEMAN, J. D. N83-29216
HOLLINS, R. A. N83-29329
HOLLOMON, J. B. N83-29443
HOLM, R. G. N83-29763
HOLMES, W. M. N83-29276
HOLT, A. R. N83-29550
HOLT, B. M. N83-29746
HOMBACH, V. N83-29588
HOOKER, C. D. N83-30200
HOOVER, D. B. N83-29909
HOPGOOD, F. R. A. N83-30090
HORST, T. W. N83-29873
HOSHALL, C. H. N83-29319
HOSHIZAKI, T. N83-30029
HOVINGH, J. N83-30250
HOWE, G. N83-30053
HOWE, J. M. N83-30021
HRENECIN, D. E. N83-29718
HSU, L. C. N83-29805
HUANG, T. S. N83-29583
HUANG, X. Y. N83-29696
HUARD, J. N83-29258
HUBBARD, C. R. N83-30292
HUBBARD, R. P. N83-29968
HUBBARD, R. W. N83-29997
N83-30004
HUCKE, E. E. N83-29399
HUEBNER, S. R. N83-29482
HUERTA, M. N83-30217
HUFFAKER, R. C. N83-30025
HUGGINS, A. W. F. N83-30036
HUISER, A. M. J. N83-29536
HULL, L. C. N83-29913
HULLEY, M. A. N83-29490
HUMENIK, F. M. N83-29212
N83-29226
N83-29237
HUMM, E. F. N83-29453
HUNEYCUTT, B. N83-29746
HUNKE, R. W. N83-29842
HUNTER, S. R. N83-29618
HURLEY, J. K. N83-29345
HUTCHINSON, M. N83-29697
HUURMAN, C. N83-29250
HWANG, T. H. N83-29741
HYMAN, E. N83-29904

I

IDEDA, S. N83-29666
IGNIZIO, J. P. N83-30077
IHARA, T. N83-29517
IKEDA, M. N83-30140
IKEDA, T. N83-30010
IMAI, Y. N83-29517
IPPOLITO, L. J. N83-29491
IRININ, G. N83-29285
ISAACS, R. G. N83-29785
ISHIMARU, A. N83-30226
ISRAEL, R. K. N83-30158
ITO, K. N83-30108
IYENGAR, S. N83-30149
IZATT, J. O. N83-29461

J

JACKSON, L. R. N83-29446
N83-29706
JACKSON, R. J. N83-29763
JACOBS, C. N83-29461
JACOBS, G. B. N83-29682
JACOBS, O. L. R. N83-30102
JAEGER, U. N83-30262
JARVIS, M. R. N83-29325
JASSBY, D. N83-30255
JAUNG, R. N83-29643
JENKINS, D. S. N83-29638
JENKINS, R. G. N83-29445
JENKINS, W. K. N83-30229
JERNIGAN, T. C. N83-30240
JESPERS, S. N83-29513
JESSOP, E. S. N83-29406
JHA, R. K. N83-29516
JOCIC, L. B. N83-30140
JOHNSON, B. V. N83-29222
JOHNSON, C. C. N83-30033
JOHNSON, D. L. N83-29926
JOHNSON, E. G., JR. N83-29702
N83-29705
JOHNSON, G. M. N83-30113
JOHNSON, J. A. N83-30169
JOHNSON, J. F. E. N83-30095
JOHNSON, N. L. N83-30139
JOHNSSON, K. O. N83-29339
JOHNSTON, D. F. N83-29591
JOHNSTON, S. N83-30074
JONES, C. N83-29235
JONES, C. M. N83-30040
JONES, R. M. N83-30170
JORDAN, C. N83-30337
JORDAN, C. A. N83-29996
JOSEPH, B. J. N83-30217
JOSHI, C. N83-30202
JOSHI, N. N83-29643
JOSLYN, H. D. N83-29174
JUNKIN, B. G. N83-29770
JUSZCZAK, N. M. N83-30011

K

KADIYALA, R. K. N83-30279
KAEPPELER, H. J. N83-30260
N83-30262
KAHM, F. N83-30289
KAIIBJIAN, R. N83-29662
KALAB, B. M. N83-29580
KALLENBERG, L. C. M. N83-30050
KALWEIT, E. N83-29615
KANNING, G. N83-29193
KARBOWSKI, J. N83-30255
KARDASHEV, N. S. N83-30335
KAREL, M. N83-30027
N83-30028
KARIS, L. N83-29917
KASISCHKE, E. A. N83-29567
KASSELL, S. N83-30181
KASTMAN, K. N83-29792
KASTNER, C. J. N83-29763
KATSANIS, T. N83-29179
KATZ, L. N83-29650
KAUFFMAN, R. L. N83-30241
N83-30249
KAUL, R. D. N83-29491
KAWAMURA, M. N83-29777
KAZAKOS, D. N83-29562
KAZEROONI, H. N83-29462
KEARNEY, J. K. N83-30080
KEETON, J. R. N83-29453
KEEVER, M. R. N83-30275
KEIL, R. G. N83-29340
KELLY, M. D. N83-29867
KENNICOTT, P. R. N83-30092
KENT, L. A. N83-29457
KERLICK, G. D. N83-29182
KERSHNER, J. D. N83-29426
KEY, J. F. N83-29717
KHARADLY, M. N83-29498
KHARIN, E. P. N83-29921
KHEIRALLAH, H. N. N83-29525
KIDNAY, A. J. N83-29350
KIEFFER, H. H. N83-29764
KIESLICH, J. M. N83-29950
KILGORE, R. A. N83-29273
KILKENNY, J. D. N83-30241
N83-30249
KIM, C. M. N83-29605
KIM, M. E. N83-29575
KIM, Y. S. N83-29561
KINAST, J. A. N83-29483
KINDSFATHER, R. R. N83-30097
KIRBY, G. C. N83-29730
KIRCHARTZ, K. R. N83-29648
KIRSENBAUM, M. S. N83-29415
KITAMURA, K. N83-29517
KITSOVSKAYA, I. A. N83-29980
KLAPISZ, C. N83-29499
KLAUBER, G. M. N83-29887
KLAUK, R. H. N83-29790
KLEIN, H. A. N83-29328
KLEIN, S. A. N83-29471
KLEMAS, V. N83-29767
KLOPFER, G. H. N83-29182
KLUMPAR, D. M. N83-29769
KNABE, W. N83-29301
KNIGHT, D. R. N83-30002
KNUTH, R. N83-29743
KNUTSON, W. K. N83-29359
KOBAYASHI, K. N83-29777
KOBRICK, M. N83-29489
KOCH, P. N83-29455
KOCZAK, M. J. N83-29362

KOFF, B. L. N83-29243
KOHL, F. J. N83-29358
KOHSIEK, W. N83-29506
KOKOTOVIC, P. V. N83-30100
KOLAWOLE, L. B. N83-29505
KOLB, D. N83-30309
KOLB, J. R. N83-29406
KOLBAS, R. N83-29815
KOLDAYEV, V. M. N83-29977
KOLODGY, R. J. N83-29480
KOMERATH, N. M. N83-29628
KONIG, P. A. N83-30049
KONNERT, J. H. N83-30082
KONOVALOV, B. N83-29287
KOROTAYEV, G. K. N83-29286
KORTANEK, K. O. N83-30120
KORTELAINEN, J. N83-30051
KOSCHEL, W. N83-29246
KOSLOW, K. N. N83-29913
KOTANSKY, D. R. N83-29200
KOVACS, W. D. N83-29472
KOVALA, P. N83-29960
KOVALENOK, V. V. N83-29286
KOVESHNIKOVA, I. V. N83-29987
KOYAMA, T. N83-29313
KOZYARIN, I. P. N83-29985
KRAPCHEV, V. N83-29613
KRATZ, R. A. N83-29839
KRAUSE, J. N83-30286
KRAUSER, W. J. N83-30196
KRAUTH, A. N83-29408
KRIEZIS, E. E. N83-29537
KRILL, J. A. N83-29535
KRISHNAN, G. N. N83-29336
KRIZ, T. A. N83-29857
KRTOLICA, R. N83-30140
KRUEGER, H. H. N83-30289
KRUEGER, M. W. N83-30079
KRUMEIN, G. N83-29622
KSIENSKI, A. A. N83-29579
KUENZI, K. F. N83-29531
KUKUSHKIN, A. V. N83-29557
KULIKOVA, A. D. N83-29975
KUMAR, K. H. N83-29444
KUMAR, V. K. N83-29729
KUNKEL, R. G. N83-29718
KUNY, W. N83-29375
KUO, H. K. N83-29364
KUTSCHERA, W. N83-29342
KYDD, G. N83-29450

L

LABAUVE, R. J. N83-30193
LACASSE, S. M. N83-29793
LACY, L. L. N83-29650
LADD, C. C. N83-29793
LADDE, G. S. N83-30140
LAGRANGE, J. P. N83-29253
LAHEY, R. T. C. N83-29187
N83-29188
LALOUX, A. N83-29511
N83-29526
LAM, N. Q. N83-29371
LAM, W. I. N83-29500
LAMBERT, N. A. N83-30300
LAMBERTSEN, C. J. N83-30003
LAMOREAUX, G. H. N83-30217
LAMPE, R. L. N83-29354
LANDER, J. F. N83-29966
LANDGREBE, D. A. N83-29748
LANDRITH, C. V. N83-30284
LANDSMAN, S. D. N83-29432
LANDY, F. J. N83-30014
LANGE, E. N83-29240
N83-29377
LANGER, M. N83-29407
LANSING, J. C. N83-29761
LASINSKI, B. N83-30232
LATER, D. W. N83-29312
LAVERGNAT, J. N83-29499
LAW, C. K. N83-29229
LAWLEY, A. N83-29362
LAYTON, D. H. N83-29556
LAZARUS, E. A. N83-30097
LAZOWSKI, J. C. N83-30038
LEBED, Y. K. N83-29980
LEBERL, F. N83-29489
LEBOEUF, C. M. N83-29830
LEE, C. N83-29609
LEE, E. N83-29498
LEE, E. K. L. N83-29333
LEE, H. W. N83-29697
LEE, J. D. N83-30255
LEE, K. T. N83-29697
LEE, M. L. N83-29312
LEE, R. W. N83-30241
N83-30249
LEE, Y. C. N83-29904
LEEMPOEL, P. N83-30274
LEFEBVRE, A. H. N83-29231
LEGECKIS, R. N83-29963
LEHMAN, A. F. N83-29238
LEHMAN, M. W. N83-29317
LEHTO, O. N83-30051
LEI, K. P. V. N83-29383
LEINKRAM, C. Z. N83-30268
LEMONS, J. E. N83-29401
LEONARD, A. N83-29636
LEONARD, J. A. N83-29842
LEPPER, F. N83-30262
LEPPING, R. P. N83-30346
LESTER, H. C. N83-30167
LESTER, T. W. N83-29334
LEVIS, A. H. N83-30298
LEVY, C. R. N83-29624
LEVY, M. N. N83-29992
LEVY, S. C. N83-29860
LEWIS, S. N83-30027
LEYBOLD, H. A. N83-29732
LEYDEN, D. E. N83-29351
LEYTHAM, K. M. N83-29938
LI, H. J. N83-29520
LIANG, E. P. N83-29645
LIANG, R. H. N83-29809
LIBSTER, E. N83-30046
LIEBE, H. J. N83-29556
LIECHTI, K. M. N83-29317
N83-29318
LIEWALD, M. N83-30092
LIKENS, W. N83-29759
LILJENBERG, G. W. N83-29480
LILLEY, D. G. N83-29220
LILLEY, J. S. N83-30210
LIM, B. S. N83-30267
LIN, J. T. N83-29696
LIN, Z. N83-30264
LIND, J. N83-30338
LINDENMEIER, K. H. N83-29502
LINDMAN, E. L. N83-30282
LINDNER, D. K. N83-30098
LINDSEY, H. N83-29845
LINDZEN, R. N83-29904
LINSCHITZ, H. N83-29345
LINSLEY, A. N83-30307
N83-30308
LIPPMANN, R. P. N83-29610
LITTLE, R. W. N83-29968
LIU, C. S. N83-30243
N83-30254
LIVINGSTON, J. D. N83-29365
LLACER, J. N83-29661
LLOYD, C. N83-30338
LO, P. N83-29509
LOBANOVA, Y. A. N83-29980
LOBSIGER, E. N83-29531
LOCKETT, F. J. N83-29990
N83-30015
LOCKMAN, W. K. N83-29634
LOGAN, W. R. N83-29393
LOGSDON, G. S. N83-29380
LONG, M. J. N83-29654
LOPEZ, A. A. N83-29665
LORENZ, E. N. N83-29953
LORGE, F. N83-29192
LOUGHEAD, T. E. N83-29303
LOVE, J. T. N83-30158
LOVEGREN, V. N83-30120
LOWE, A. N83-29988
LOWENSTEIN, M. Z. N83-29845
LU, S. T. N83-29998
LUCAS, W. H. N83-29271
LUCHEVSKIY, B. A. N83-29976
LUENEBURG, E. N83-29497
LUIJEN, L. J. M. N83-29389
LUKAC, C. F. N83-30330
LUKAS, R. N83-29792
LUSHENG, F. N83-29279
LYON, J. N83-29904
LYON, J. F. N83-30240
LYONS, L. N83-30211
LYTLE, R. J. N83-29910
LYUBCHENKO, S. A. N83-29984
LYZENGA, D. R. N83-29567

M

MACCALLUM, N. R. L. N83-29255
N83-29259
MACCHIARELLA, G. N83-29554
MACELROY, R. D. N83-30016
N83-30017
N83-30018
MACFARLANE, D. R. N83-30279
MACISAAC, B. D. N83-29262
MACMILLAN, W. L. N83-29249
MADER, C. L. N83-29426
MAEDA, H. N83-29777
MAESTRE, M. F. N83-29405
MAGER, M. N83-29997
MAGLIOZZI, B. N83-29178
MAHER, J. T. N83-29995
MAHLUM, D. D. N83-29312
MALACHESKY, P. N83-29862
MANABE, T. N83-29517
MANDOUR, I. A. N83-29538
MANNER, E. J. N83-29502
MANNING, F. S. N83-30316
MANNING, J. E. N83-30166
MANOLA, F. N83-30088
MANZO, M. A. N83-29805
MARGOZZI, A. P. N83-29924
MARKHAM, B. L. N83-29760
MARKLEY, O. W. N83-29937
MAROV, M. Y. N83-30343
MARTIN, C. F. N83-29751
MARTIN, D. L. N83-30163
MARTIN, D. W. N83-29487
MARTIN, L. N83-29499
N83-29501
MARTIN, L. C. N83-30273
MARTINI, W. R. N83-30328
MARTSOLF, J. D. N83-29778
N83-29779
N83-29780
N83-29781
N83-29782
MASLAKOV, O. A. N83-29979
MASON, K. O. N83-30352
MASON, R. J. N83-30244
MASON, T. O. N83-29366
MASSIS, T. M. N83-29337
MASTERS, C. O. N83-29922
MASTERS, J. E. N83-29317
MASUDA, Y. N83-29666
MATRICCIANI, E. N83-29508
N83-29552
MATSUNAKA, N. N83-29529
MATSUZAWA, K. N83-29529
MATTHEW, W. N83-30004
MATTHEWS, D. L. N83-30241
N83-30249
MAURI, M. N83-29554
MAX, C. N83-30232
MAXWELL, H. G. N83-29808
MAY, R. A. N83-30217
MAYER, A. N83-30261
MAYES, R. A. N83-29879
MAYRARGUE, S. N83-29499
MCADOO, D. C. N83-29751
MCCALL, J. N83-29724
MCCOMB, H. G., JR. N83-29733
MCCUE, H. K. N83-29458
MCCUNE, B. P. N83-30071
MCDANIEL, J. C. N83-29223
MCDONALD, B. E. N83-29952
MCDONALD, G. E. N83-29388
MCELIGOT, D. M. N83-29640
MCEWAN, N. J. N83-29527
N83-29528
MCFADDEN, D. N83-29820
MCGILL, R. N83-29714
MCGILLEM, C. D. N83-29766
MCGUINESS, R. N83-29550
MCILWAIN, M. E. N83-29717
MCKINNEY, R. L. N83-29727
MCKINNEY, T. G. N83-29850
MCKISSON, R. L. N83-30218
MCLAUGHLIN, H. B. N83-29447
MCMURDIE, H. F. N83-30292
MEAD, J. W. N83-29617
MEAD, W. C. N83-30232
MEADOWS, A. J. N83-30337
MEADOWS, G. A. N83-29567
MEANS, J. L. N83-29787
MECHAN, P. N83-29897
MEGANCK, J. N83-29513
MEGER, R. A. N83-30176
MEIER, H. E. N83-29619
MEIJER, P. H. E. N83-30278
MELLIAR-SMITH, P. M. N83-30052
MELTON, R. G. N83-29191
MENDELSOHN, M. H. N83-29373
MENG, P. R. N83-29235
MERKLIN, J. F. N83-29334
MESCHTER, P. J. N83-30271

MESZTENYI, C. K. N83-30081
MEYER-PIENING, H. R. N83-29301
MEYER, G. H. N83-30133
MEYER, H. N83-29376
MEYER, W. E. N83-29466
MEYERS, S. P. N83-29683
MIAO, W. N83-29272
MICHAELSON, S. M. N83-29998
MICHAS, R. D. N83-30038
MICHETTE, A. G. N83-30213
MIESSNER, H. N83-30027
MILLER, D. E. N83-29195
MILLER, D. W. N83-29861
MILLER, E. F. N83-29493
MILLER, E. K. N83-29698
MILLER, G. D. N83-29425
MILLER, M. C. N83-29274
MILLIMAN, J. W. N83-29939
MILLS, W. H. N83-30106
MILNER, E. J. N83-29597
MIN, O. K. N83-29848
MINGJIU, L. N83-29566
MISME, P. N83-29523
MITCHELL, C. A. N83-30021
N83-30022
MITCHELL, H. N83-29904
MITCHELL, M. K. N83-30006
MIX, T. W. N83-29423
MIYAZAKI, Y. N83-29777
MLYNSKI, D. A. N83-29820
MOCENIGO, J. M. N83-30138
MOCKAPETRIS, P. V. N83-29573
MODELL, M. N83-30027
MOEZZI, S. N83-29532
MOHLER, J. H. N83-29867
MOHSEN-METWALLY, M. N83-30140
MOIR, R. W. N83-30255
MOLLON, J. D. N83-30001
MOLTON, P. M. N83-29432
MON, J. P. N83-29499
N83-29504
MONGIA, H. C. N83-29224
MONSLER, M. J. N83-30250
MONTGOMERY, D. N83-29642
N83-30252
MOORE, B., III N83-30016
MOORE, F. K. N83-29175
MOORE, J. A. N83-30166
MOORE, R. K. N83-29561
MOOSE, R. A. N83-30349
MOOSE, R. L. N83-29271
MORARI, M. N83-30101
MORENO, J. B. N83-29851
MORITZ, H. N83-29902
MORRIS, B. J. N83-30271
MORRIS, D. H. N83-29315
MORRIS, J. F. N83-29804
MORRIS, M. C. N83-30292
MORRIS, V. L. N83-29837
MORRISON, A. D. N83-30269
MOSTAFA, A. M. N83-29215
MOUPFOUMA, F. N83-29519
MOYER, R. D. N83-30233
MROCZEK, W. N83-29623
MUDGE, L. K. N83-29332
MUELLER, G. N83-30261
MUELLER, N. N83-29240
N83-29377
MUELLER, P. E. N83-29606
MUGGLI, W. N83-29263
MULLAHY, M. A. N83-29692
MULLER, C. H., III N83-29338
N83-30251
MUMMA, M. J. N83-30342
N83-30344
MUNGER, A. C. N83-29617
N83-29867
MURPHY, J. K. N83-30330
MURPHY, J. R. N83-29896
MURPHY, K. P. N83-29477
MURPHY, M. J. N83-29720
MURPHY, W. C. N83-29697
MURRAY, R. W. N83-29327

N

NAGARAJAN, M. A. N83-30210
NAKAMURA, Y. N83-29636
NAKAO, T. N83-30010
NANDY, K. N83-30337
NEAL, P. F. N83-29252
NEELEY, G. M. N83-29228
NEELY, G. M. N83-29237
NEISWANDER, P. A. N83-29817
NELEPO, B. A. N83-29286
NELSON, D. A. N83-29432
NELSON, R. A. N83-29305
NESEWICH, J. P. N83-29814
NESS, N. F. N83-30345
N83-30346
NETTER, G. N83-29649
NEUMAN, L. N83-29872
NEUMEIER, L. A. N83-29382
NEWMAN, L. N83-29874
NEWMAN, R. W. N83-29319
NEWTON, J. J. N83-30049
NEWTON, L. E. N83-29458
NEYNABER, R. H. N83-30177
NG, C. B. N83-29395
NGUYEN, Q. T. N83-29548
NICHOLS, L. D. N83-29419
NICKOLA, P. W. N83-29873
NIELSEN, T. K. N83-29352
NIEMANN, R. N83-29847
NIKJOOY, M. N83-29224
NILSSON, N. A. N83-29469
NINOMIYA, H. N83-30010
NISEN, D. B. N83-29650
NISHIJO, R. N83-30039
NISWANDER, J. K. N83-29302
NIXON, D. N83-29182
NOLA, F. J. N83-29593
NOONAN, J. N83-29897
NORCROSS, G. A. N83-29796
NORI, K. V. N83-30044
NORRIS, H. F., JR. N83-29635
NORRIS, J. N83-30350
NOTIS, M. R. N83-29738
NUFER, W. H. N83-29269
NUNES, A. C., JR. N83-29356
NUTTEN, B. N83-29499

O

OBERG, D. L. N83-29668
OCHMAN, J. N83-29612
ODERIY, Y. A. N83-29982
OEN, C. N83-30005
OETTINGER, P. E. N83-29609
OFSTAD, E. B. N83-29353
OGAWA, K. N83-29777
OHARA, S. A. N83-30067
OKUNOLA, O. N83-30268
OLDERVIK, O. N83-29352
OLIMPOV, V. N83-29285
OLIVER, R. G. N83-29201
OLLIS, D. F. N83-29421
OLOUGHLIN, M. C. N83-29951
OLSEN, R. L. N83-29518
OLSEN, W. A. N83-30168
OLSZEWSKI, M. N83-29827
ONIONS, R. A. N83-29264
ONISKO, B. L. N83-30030
ONSTOTT, R. G. N83-29561
OPPENHEIM, A. K. N83-29233
OPPENLAENDER, T. N83-30262
OPPOLZER, H. N83-30288
ORAN, E. S. N83-29210
OREILLY, J. N83-30100
OROURKE, M. N83-29455
ORVIS, W. J. N83-30273
OSBOURN, G. C. N83-29866
OSHIMA, S. N83-29777
OSSING, H. A. N83-29300
OSTERHOLM, M. T. N83-29800
OSWALD, F. B. N83-29709
OTTOMEYER, J. D. N83-29199
OWEN, N. N83-29498
OWEN, R. B. N83-29680

P

PACHONIK, H. N83-30290
PADRICK, T. D. N83-29337
PALMER, J. M. N83-29763
PALMOUR, V. N83-30308
PALMOUR, V. E. N83-30307
PANCHAL, C. N83-29847
PANCHENKO, V. Y. N83-30341
PAPADOPOULOS, D. N83-29904
PAPADOPOULOS, K. N83-30171
N83-30182
PAPITASHVILI, N. E. N83-29921
PAPITASHVILI, V. O. N83-29921
PARABONI, A. N83-29554
PARETZKIN, B. N83-30292
PARKER, H. S. N83-30292
PARKER, J. W. N83-30003
PARRISH, D. D. N83-30175
PARTHASARATHY, S. P. N83-29595
PATANI, A. N83-29481
PATEL, V. C. N83-29637
PATNAIK, P. C. N83-29928
PATTERSON, G. T. N83-29265
PATTERSON, M. R. N83-30037
PEARL, R. H. N83-29836
PEARSON, A. E. N83-30138
PEARSON, J. T. N83-29841
PECK, T. N83-29894
PELLIN, M. J. N83-29373
PELLOUX, R. M. N83-29361
PELOSE, J. N83-29492
PELROY, R. A. N83-29312
PELTZ, A. L. N83-29451
PENSTON, M. V. N83-30337
N83-30338
PERLMAN, G. N83-30063
PERMINOV, V. G. N83-29283
PEROLA, G. C. N83-30338
PERS, A. N83-29613
PETERS, J. W. N83-29348
PETERS, P. E. N83-30214
PETERSEN, G. W. N83-29753
PETERSON, L. G. N83-29718
PETERSON, R. L. N83-29663
PETTENPAUL, E. N83-29375
PETUCHOWSKI, S. J. N83-30228
PHILIPSON, W. R. N83-29745
PHILLION, D. W. N83-30232
PHILLIPS, B. A. N83-29477
PHILLIPS, G. T. N83-29928
PHILLIPS, N. S. N83-29190
PHILLIPS, R. G. N83-30119
PHILLIPS, R. J. N. N83-30208
PHILLIPS, T. N. N83-30107
N83-30109
N83-30112
PICHAI, V. N83-30140
PICKARD, S. N83-29522
PIEL, K. N83-29251
PILIDIS, P. N83-29255
PIQUETTE, J. C. N83-30130
PIROTTE, A. N83-30088
PITTS, J. H. N83-30250
PLATZMAN, L. K. N83-30122
N83-30125
PLEASANT, L. G. N83-30041
PLICHTA, M. R. N83-29398
PODWYSOCKI, M. H. N83-29765
POHL, L. N83-30286
POIARESBAPTISTA, J. P. V. N83-29552
POLLACK, S. V. N83-30158
POMERNACKI, C. L. N83-29458
POOLE, R. L. N83-29817
POPHAM, R. W. N83-29947
PORTER, L. F. N83-29354
PORTER, M. J. N83-29268
PORTIER, R. J. N83-29883
PORTNOFF, M. R. N83-30086
POSKANZER, J. A. N83-29661
POST, D. N83-30201
POTOCNIK, V. N83-29239
POTOK, R. E. N83-30247
POWELL, R. C. N83-29689
POWERS, J. M. N83-29617
PRACCHI, M. N83-30117
PRAKASH, S. N. N83-29482
PRATT, D. T. N83-29227
PRAVDO, S. H. N83-29746
PREPARATA, F. P. N83-30117
PREVO, C. T. N83-30154
PRINCE, J. M. N83-29726
PRITCHARD, P. H. N83-29889
PROUDFOOT, J. N83-30212
PRUETT, E. C. N83-29303
PU, S. L. N83-29736
PUHL, M. N83-29589
PUZAK, J. C. N83-29354
PYLE, R. N83-30201
PYRROS, N. P. N83-30292

Q

QUARTERONI, A. N83-30111
QUATIERI, T. F. N83-30128
QUINN, R. K. N83-29860

R

RADCLIFF, R. N83-29540
RADDATZ, A. E. N83-29381
RADHAKRISHNAN, K. N83-29225
RADKE, H. N83-29196

RADOVIC, L. R. N83-29445
RAEUCHLE, E. N83-30258
RAFANIELLO, W. N83-29398
RAGGAM, J. N83-29489
RAMAGE, J. N83-29794
RAMAN, S. N83-30191
N83-30192
RAMIREZ, A. L. N83-29910
RAMKUMAR, R. L. N83-29314
RAMSDEN, J. D. N83-29454
RANDALL, D. N83-29927
RANKIN, M. B. N83-29683
RAPER, C. D., JR. N83-30026
RASMUSSEN, A. L. N83-29703
RATHZ, T. J. N83-29650
RAVNER, H. N83-29400
RAYMON, N. S. N83-29410
RECHT, H. L. N83-30218
REDFIELD, R. N83-29455
REED, D. W. N83-29797
REED, G. M. N83-30116
REGNIER, P. G. N83-29371
REHME, H. N83-30288
REICHHARDT, T. N83-29298
REID, J. N83-30307
N83-30308
REID, J. M. N83-30007
REIDY, J. J. N83-30037
REIFSNIDER, K. L. N83-29318
REILLY, R. W. N83-29859
REINISCH, B. W. N83-30064
N83-30065
REISLER, H. N83-29688
REITER, L. M. N83-29502
RENNER, H. N83-29347
RENNHACK, R. K. N83-29818
REPAR, J. N83-29808
RESIO, D. T. N83-29957
REUTER, R. C., JR. N83-29838
RIBBENS-PAVELLA, M. N83-30140
RIBE, F. L. N83-30239
RICE, D. P. N83-29758
RICE, J. K. N83-29337
RICHARDS, F. A. N83-30353
RICHNER, H. N83-29925
RICK, H. N83-29263
RICKEY, M. E. N83-29586
RICKLEY, E. J. N83-30329
RIDGWAY, W. L. N83-30349
RILEY, J. P. N83-30170
RILEY, M. O. N83-29406
RILEY, W. J. N83-29658
ROACHE, P. J. N83-30131
ROBBINS, G. A. N83-30281
ROBERSON, P. L. N83-30200
ROBERTS, M. M. N83-29657
ROBERTS, N. J., JR. N83-29998
ROBERTS, R. B. N83-29939
ROBERTSON, K. B. N83-29303
ROBERTUS, R. J. N83-29332
ROBINSON, G. A. N83-29195
ROBINSON, M. B. N83-29650
ROCK, P. B. N83-29995
RODRIGUEZ, C. F. N83-29359
ROE, R. J. N83-29396
ROEDER, C. W. N83-29723
ROELOF, E. C. N83-30348
ROEMER, M. N83-30286
ROEMER, P. B. N83-30247
ROFFEY, R. N83-29881
ROGERS, C. R. N83-30067
ROGERS, J. W., JR. N83-29430
ROGUE, F. N83-29664
ROHRBACH, C. N83-29178
ROLFE, E. J. N83-29494
ROMAN, G. C. N83-30158
ROMANOVA, M. M. N83-30333
ROME, J. A. N83-30240
N83-30242
ROMESBERG, L. E. N83-30217
ROOD, R. B. N83-29892
ROORYCK, M. N83-29499
ROSE, M. E. N83-30112
ROSENBERG, A. N83-29933
ROSENBERG, P. N83-29194
ROSENBLUTH, M. N. N83-30253
ROSENFELD, A. N83-30013
ROSFJORD, T. J. N83-29715
ROSINBERG, M. L. N83-29367
ROSSI, E., JR. N83-29824
ROTHERMEL, H. J. N83-29620
ROTMAN, W. N83-29578
ROUGEVIN-BAVILLE, M. N83-29247
ROUSSEAU, J. N83-29829
ROUSSEAU, M. D. N83-30207
ROUX, G. N83-29504
ROWAN, L. C. N83-29765
ROWE, N. C. N83-30310
ROYCE, B. S. H. N83-29230
ROYSTER, D. M. K. N83-29446
ROZENTAL, I. L. N83-30334
RUBTSOVA, N. B. N83-29980
RUDNEV, M. I. N83-29975
RUGGIERO, C. M. N83-29320
RUITBERG, A. P. N83-29590
N83-29594
RUMSBY, P. T. N83-30264
RUSAK, Z. N83-29181
RUSH, S. M. N83-29914
RUSSELL, J. A. N83-29432
RUTENBURG, V. G. N83-30099
RUTHBERG, S. N83-29672
RYERSON, D. E. N83-29665

S

SABET-PEYMAN, F. N83-30221
SAKSENA, V. R. N83-30100
SALISBURY, F. B. N83-30024
SALISBURY, J. W. N83-29765
SALMAN, M. J. N83-29516
SALOMONE, L. A. N83-29472
SALVINO, J. T. N83-29234
SAMPSON, J. B. N83-29995
SANATHANAN, L. P. N83-29876
SANDBERG, M. N83-29484
N83-29485
SANDER, R. K. N83-30183
SANDERS, A. A. N83-29703
SANFORD, T. W. L. N83-30187
SANTAVICCA, D. A. N83-29230
SANTILLI, R. M. N83-30160
SANZ, J. L. C. N83-29583
SAPOWITH, A. D. N83-29865
SARAVANAMUTTOO, H. I. H. N83-29262
SARV, H. N83-29213
SATCHLER, G. R. N83-30189
N83-30190
SATHER, N. N83-29847
SATO, S. N83-29666
SATYANARAYANA, A. N83-30159
SAUNDERS, D. N83-30053
SAVAGE, R. N83-29763
SAVIDGE, J. L. N83-29444
SAVINYKH, V. N83-29282
SAXON, D. H. N83-30212
SAYLAK, D. N83-29461
SCARPACE, F. N83-29291
SCHAEFER, J. F. N83-29825
SCHAEFER, K. E. N83-30002
SCHAMAUN, J. T. N83-29310
SCHARR, K. N83-29897
SCHARRE, D. L. N83-30188
SCHELL, D. N83-29830
SCHICHL, H. N83-30287
SCHINDLER, S. N83-29408
SCHINK, H. N83-30288
SCHLESAK, J. J. N83-29512
SCHMID, W. N83-30291
SCHMIDT-NIELSEN, A. N83-29568
SCHMIDT, H. N83-30259
N83-30260
N83-30262
SCHMIDT, R. N83-30262
SCHMIDT, S. F. N83-29193
SCHOENDORF, W. H. N83-29564
SCHROEDER, D. J. N83-29994
SCHROEDER, M. E. N83-29692
SCHUERMAN, D. W. N83-29558
SCHULZE, R. L. N83-29888
SCHWARTZ, M. W. N83-29372
SCHWARTZ, S. E. N83-29872
N83-29874
SCHWARZ, A. C. N83-29429
SCHWEGLER, B. R., JR. N83-29880
SCHWOERER, K. N83-30261
SCOTT, D. R. N83-29592
SCOTT, T. E. N83-29370
SCOTTI, N. N83-29897
SCRIBNER, C. G. N83-29741
SCULLY, M. C. N83-29690
SEARCY, J. Q. N83-29817
SEARS, R. D. N83-29900
SEEBASS, A. R. N83-29177
SEEGMILLER, H. L. N83-29634
SEGA, R. M. N83-30227
SEGINER, A. N83-29180
N83-29181
SEIFORD, L. N83-30157
SEINER, J. M. N83-30164
SEKHON, R. N83-29776
SELANGER, K. A. N83-29352
SELBUZ, H. N83-30140
SELVIDGE, J. N83-29444
SENJANOVIC, G. N83-30294
SEPELAK, D. J. N83-29328
SEPULVEDA, C. F. N83-29183
SERAFINI, T. T. N83-29392
SEYFERTH, D. N83-29328
N83-29403
SEYFRIED, W. E., JR. N83-29958
SHABICA, S. V. N83-29467
SHADDAY, M. A., JR. N83-29626
N83-29644
SHAFFER, L. E. N83-30353
SHAFFER, R. J. N83-29911
SHAHDAD, B. M. N83-30046
SHAMPINE, L. F. N83-30136
SHANDALA, M. G. N83-29974
N83-29987
SHARI, V. P. N83-30343
SHARIEF, S. M. N83-29514
SHAW, M. N83-30075
SHAW, W. H. N83-30106
SHCUHMAN, R. A. N83-29567
SHEFFIELD, J. N83-30240
SHEFFIELD, S. A. N83-29659
SHEIBLEY, D. W. N83-29805
SHELLARD, I. J. N83-29322
SHELTON, J. E. N83-29882
SHENG-FOGG, C. N83-29385
SHERA, E. B. N83-30194
SHERIDAN, T. B. N83-29462
SHERMAN, A. N83-29324
SHERWOOD, R. J. N83-30086
SHESTIPEROV, V. A. N83-29978
SHIMIZU, M. N83-29991
SHINN, R. D. N83-29771
SHIPP, R. F. N83-29296
SHIRLEY, J. A. N83-29308
SHIVES, T. R. N83-29728
SHOPE, S. M. N83-29799
SHUEN, J. S. N83-29211
SHVAYKO, I. I. N83-29985
SIDLES, P. H. N83-29839
SIEBELS, J. N83-29407
SIEMERS, P. M., III N83-29278
SIEVERS, A. J. N83-29685
SIEVERS, H. N83-29248
SILBERMANN, A. N83-29508
N83-29533
SILJAK, D. D. N83-30140
SIMON, R. M. N83-29328
SIMONDS, R. A. N83-29315
SIMPERS, B. F. N83-29378
SINAI, N. N83-29345
SINDNER, C. L. N83-30072
SINGER, R. D. N83-29800
SINGH, M. S. N83-29662
SINHA, N. N83-29230
SIRTL, E. N83-29868
SIVAKUMAR, B. N83-29474
SIXT, G. N83-29623
SJOBERG, J. J. N83-29381
SJOEBERG, M. N83-29484
N83-29485
SKELTON, J. N83-29929
SKOGEN, J. D. N83-30224
SKURATNIK, V. N83-29284
SLADEK, K. J. N83-29422
SLATER, P. N. N83-29763
SLOAN, E. D. N83-29350
SLONIM, A. R. N83-29968
N83-29969
SMALLBERG, D. A. N83-30066
SMARTT, H. B. N83-29717
SMITH, B. M. N83-30092
SMITH, D. F. N83-30150
SMITH, D. R. N83-30124
SMITH, F. L. N83-29906
SMITH, F. T. N83-29629
N83-29630
SMITH, H. N83-29509
SMITH, J. C. N83-29304
SMITH, J. W. N83-29843
SMITH, R. A. N83-30000
SMITHER, R. K. N83-30285
SMYTH, W. H. N83-30336
SNIDER, E. M. N83-30316
SO, R. M. C. N83-29224
SOBIESKI, P. N83-29511
N83-29526
SOKOLOVA, I. P. N83-29980
SOLIMINI, D. N83-29508
N83-29530
N83-29533
SOLOMON, A. S. P. N83-29211

SOLOMON, H. N83-30149
SOMERVILLE, P. N. N83-29936
SORENSEN, C. M. N83-29334
SORENSEN, J. A. N83-29186
SPALART, P. R. N83-29636
SPECKHARDT, H. N83-29374
SPEIER, F. N83-30173
SPILLMAN, J. J. N83-29394
N83-29449
N83-29632
SPINDOLA, K. N83-29450
SPITZE, L. A. N83-30033
SPRANGLE, P. N83-29684
SPRINGER, J. N83-30267
SRINIVASAN, S. N83-29819
SRITHARAN, S. S. N83-29177
SRIVATSA, S. K. N83-29226
ST.CLAIR, A. K. N83-29390
ST.CLAIR, T. L. N83-29390
N83-29391
STADIE, L. N83-29869
STAEBLER, C. J., JR. N83-29378
STALLMANN, K. N83-29374
STALNAKER, D. K. N83-29326
STANTON, J. F. N83-29723
STANTON, P. L. N83-29428
STARK, W. E. N83-29582
STARLING, K. E. N83-29444
STEARNS, C. A. N83-29358
STECKL, A. J. N83-29598
STEELE, R. S. N83-29827
STEENEKEN, H. J. M. N83-29587
STEENKEN, W. G. N83-29261
STEIN, Y. N83-29230
STEPHENS, J. R. N83-29360
STERNBERG, R. J. N83-30012
STETSON, H. D. N83-29266
STEVENS, H. N83-29847
STEWART, K. A. N83-30097
STEWART, W. F. N83-29716
STILLE, J. K. N83-29397
STINCHCOMB, W. W. N83-29318
STITT, B. R. N83-29676
STOLOFF, N. S. N83-29369
STONER, E. R. N83-29768
STRAIN, P. N83-30307
N83-30308
STRATTEL, R. J. N83-29302
STRAUB, C. P. N83-29800
STRAUSS, B. N83-29415
STRICKLAND, D. J. N83-29901
STRICKLAND, J. I. N83-29512
STRINGFELLOW, K. N83-29670
STUART, G. N83-30207
STUCKI, M. J. N83-30158
STUMPF, K. D. N83-29692
STURROCK, P. A. N83-30347
STUTZ, J. N83-30157
SUBBAIAH, M. V. N83-29232
SUBUDHI, M. N83-29740
SULLIVAN, R. E. N83-29221
SULLIVAN, W. N. N83-29858
SUNG, C. H. N83-29638
SUNSHINE, C. A. N83-30066
SUTTON, R. D. N83-29221
SUUBERG, E. M. N83-29346
SWADLEY, S. D. N83-29934
SWAIM, R. J. N83-29591
SWET, C. J. N83-29857
SWISHER, J. N83-29831
SYLVAIN, M. N83-29499

T

TADMOR, E. N83-30110
TAFT, B. A. N83-29960
TAKEMORI, H. T. N83-30216
TALBOT, J. M. N83-29992
N83-29993
TANAKA, M. N83-29777
N83-30171
TANEJA, D. N. N83-30163
TANG, C. M. N83-29684
TANG, J. S. N83-30064
TANG, S. Y. N83-30177
TANIMOTO, T. N83-29893
TARASYUK, N. Y. N83-29975
TARDUCCI, D. N83-29546
TATEYA, J. L. N83-29444
TAYLOR, A. H. N83-29706
TAYLOR, D. J. N83-30231
TAYLOR, L. D. N83-29818
TAYLOR, M. S. N83-30152
TCHERNEV, D. I. N83-29840
TEGLAS, R. N83-30108
TEMPS, F. N83-30206
TEREKHOV, A. N83-29290
TERMAAT, B. S. N83-29567
TERRY, R. E. N83-30238
THACKER, J. R. N83-30223
THISSEN, D. N83-30151
THOLEN, A. D. N83-29473
THOMAS, A. N83-29847
THOMAS, B. N83-29623
THOMAS, C. E. N83-30097
THOMAS, J. F. N83-29559
THOMAS, L. C. N83-30077
THOMAS, S. W. N83-29663
THOMPSON, E. S. N83-29942
THOMPSON, W. B. N83-30080
THOMSON, R. A. N83-29190
THORNE, R. E. N83-29608
THORNTON, E. C. N83-29958
THORPE, R. K. N83-29911
THUMM, M. N83-30261
THUROW, T. L. N83-29879
TIBBITTS, T. W. N83-30023
TIEN, J. K. N83-29360
TIERNEY, G. D. N83-29878
TIFFON, J. N83-29519
TIMCHENKO, O. I. N83-29987
TINDELL, R. H. N83-29269
TINGLE, A. N83-29935
TINOCO, I., JR. N83-29405
TJELFLAAT, P. O. N83-29352
TOHMA, K. N83-29517
TOMASHEVSKAYA, L. A. N83-29981
TOMPKINS, A. N. N83-29438
TOOPS, P. L. N83-29467
TORSTVEIT, J. N83-29898
TOUCHET, P. N83-29416
TOWNSEND, F. N83-29291
TRACI, R. M. N83-29928
TRACY, B. A. N83-29957
TRAPPMANN, K. N83-29254
TRASK, R. P. N83-29956
TRINOS, M. S. N83-29982
TSE, E. N83-30099
TSEN, Y. S. N83-29567
TUKEY, J. W. N83-30084
TURNER, L. N83-30246
TURNER, R. E. N83-29923
N83-30232
TUTTLE, M. H. N83-29273
TWOGOOD, R. E. N83-30086
TYNDEL, M. N83-30213

U

UCKERMANN, R. N83-29196
UEBELE, P. N83-29623
UHM, H. S. N83-29603
N83-29604
N83-29605
N83-30178
ULLMAN, T. L. N83-29722
ULMAN, D. A. N83-29317
N83-29318
UNDERWOOD, J. H. N83-30222
UNGER, P. E. N83-29346
UYEDA, S. N83-29777

V

VAGIN, Y. Y. N83-29978
VALENTIN, R. N83-29589
VANBRUNT, V. N83-30293
VANDENBERG, P. M. N83-30143
VANDERHOEVEN, G. F. N83-30104
VANDERVORST, A. N83-29513
N83-29671
VANDERWELLE, R. N83-29647
VANEST, J. N83-29961
N83-29962
VANGELDER, B. H. W. N83-29920
VANGELDEREN, J. A. N83-30142
VANHOENACKER, D. N83-29513
VANLANDINGHAM, H. F. N83-29271
VANLEHN, K. N83-30009
VANONSELEN, C. N83-29916
VANROSENDALE, J. N83-30056
VANSCHINGEN, M. N83-29511
N83-29526
VARTSKY, D. N83-30006
VARVOGLIS, H. N83-30182
VASSILIOU, S. N83-29954
VASTOLA, K. S. N83-30126
VEGDAHL, S. R. N83-30076
VELDHORST, M. N83-30103
VENEMA, T. N83-29792
VENUS, W. N83-30213
VERARDO, A. E. N83-29861
VERICAT, F. N83-29367
VERMEULEN, P. E. J. N83-29653
N83-29803
VILAR, E. N83-29509
VINOGRADOV, G. I. N83-29974
VINOIS, T. N83-29513
VIRKAR, A. V. N83-29398
VIZZINI, R. W. N83-29269
VLEGHERT, J. P. K. N83-29256
VO-DINH, T. N83-29341
VOGT, J. H. N83-30297
VOLZ, H. N83-30267

W

WADZINSKI, H. N83-29897
WAECHTER, D. A. N83-29667
WAGNER, H. G. N83-30206
WAGNER, J. N83-30291
WAGNER, J. H. N83-29174
WAGNER, M. T. N83-29742
WAINER, H. N83-30151
WAITE, J. H. N83-30095
WALDTEUFEL, P. N83-29523
WALKER, P. L., JR. N83-29445
WALKINSHAW, J. W. N83-29422
WALLACE, R. G. N83-29491
WALTER, K. H. N83-30289
WALTERS, E. J. N83-29675
WANG, C. L. N83-29662
WANG, C. P. N83-29691
WANG, P. S. N83-29340
WANG, R. T. N83-29558
WANG, Y. K. N83-29740
WARDEN, W. H., III N83-30122
WARHAM, A. G. P. N83-29487
WARK, C. E. N83-29217
WASSERSTROM, E. N83-29181
WATANABE, N. N83-29666
WATERMAN, A. T. N83-29507
WATSON, P. A. N83-29527
N83-29528
N83-29543
WATTS, D. N83-29669
WAY, J. D. N83-29355
WAYNANT, R. W. N83-29694
WEAVER, G. N83-29509
WEAVER, H. A. N83-30344
WEBB, R. C. N83-30163
WEBBER, R. V. N83-29512
WEBER, D. C. N83-29400
WEBER, G. N83-30286
WEBER, J. N83-30291
WEBER, R. F. N83-29330
WEBRE, J. L. N83-29199
WEBSTER, A. R. N83-29500
WECHSLER, H. N83-29472
WEI, Y. P. N83-29607
WEINBERG, M. H. N83-29606
WEISS, S. B. N83-29875
WEIXELBAUM, K. N83-30258
WELCH, K. M. N83-29855
WELLINGTON, J. N83-30092
WELLS, D. R. N83-30135
WELSH, J. P. N83-29596
WENYING, W. N83-30230
WERNER, G. N83-29459
WERNER, R. W. N83-29424
WERTHEN, J. G. N83-30266
WESTERINEN, J. N83-29643
WESTERLUND, F. V. N83-29771
WESTWATER, E. R. N83-29533
WETZEL, P. E. N83-29854
WHARTON, R. A., JR. N83-30016
WHEATLEY, J. C. N83-29853
WHEELER, D. R. N83-29311
WHIPPLE, R. D. N83-29173
WHITE, J. I. N83-29395
WHITE, R. N. N83-29474
WHITE, S. S. N83-29835
WHITTEN, C. B. N83-29906
WICKENS, C. N83-29999
WICZER, J. J. N83-29866
WIELOPOLSKI, L. N83-30006
WIERSMA, D. J. N83-29748
WIESEL, M. N83-29620
WIJK, G. N83-29918
N83-29919
WILCOX, C. H. N83-30129
WILDER, D. G. N83-29664
WILHELM, R. N83-30261
WILKINSON, G. N83-29323
N83-29676

WILLARD, W. A. N83-29728
WILLI, O. N83-30264
WILLIAMS, D. N83-29755
WILLIAMS, J. E. C. N83-30247
WILLIAMS, R. A. N83-29201
WILLIAMS, R. L. N83-30078
WILLIAMS, S. S., JR. N83-29794
WILLIAMS, W. R. N83-29339
WILLIS, P. N83-29809
WILSON, B. W. N83-29312
WILSON, J. M. N83-30002
WINCHESTER, L. W., JR. N83-29899
WINSLOW, S. G. N83-30005
WIRSCHING, P. H. N83-29731
N83-29734
WISHNER, R. P. N83-30099
WISWELL, R. I. N83-29309
WITHEROW, W. K. N83-29680
WITTBERG, T. N. N83-29340
WITTGEN, P. P. M. M. N83-29389
WITTIG, C. N83-29668
WONG, F. W. N83-30033
WONG, M. M. N83-29381
WONG, S. S. N83-29422
WOODS, C. M. N83-29370
WOODS, J. G. N83-30225
WOTSCHACK, J. N83-30186
WRIGHT, C. W. N83-29312
WRIGHT, D. N83-30004
WRIGHT, R. B. N83-29373
WRIGHT, R. L. N83-29304
WRIGLEY, R. N83-29759
WROBEL, T. F. N83-29616
WU, T. T. N83-29734
WULF, W. A. N83-30044
WUNDT, K. N83-29376
WURM, J. N83-29483
WYDEVEN, T. N83-30030
N83-30033

X

XU, Z. N83-29279

Y

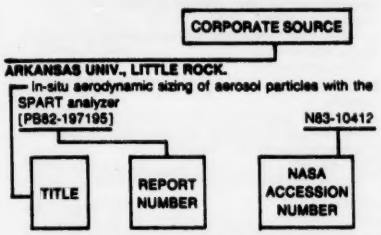
YAMAKI, D. A. N83-29391
YAMAUCHI, S. T. N83-29652
YEE, J. H. N83-30273
YEN, A. T. N83-29172
YERKE, T. B. N83-30315
YODER, R. C. N83-30200
YOERKIE, C. A. N83-30166
YORK, R. L. N83-30231
YOSHIMOTO, T. N83-30042
YOSHIMURA, H. R. N83-29310
N83-30217
YOUNG, C. E. N83-29373
YOUNG, D. A. N83-29646
YOUNG, K. M. N83-29594
YU, K. B. N83-29766
YUEN, P. C. N83-29420
YUKUTAKE, T. N83-29777
YUSHEN, J. N83-29566
YUUKI, H. N83-29529

Z

ZAHRAH, T. F. N83-29464
ZAHRAY, R. N83-29461
ZALOUDEK, F. R. N83-29859
ZANEDIS, B. N83-29416
ZANGMEISTER, R. L., JR. N83-30073
ZANGRANDO, F. N83-29856
ZAYTSEV, Y. N83-29288
ZDEBEL, P. N83-29621
ZE, F. N83-30232
ZEIDMAN, B. N83-30205
ZELWER, R. N83-29907
ZHANG, C. N83-29695
ZHANG, C. Q. N83-29520
ZHANG, J. N83-30070
ZHANG, Z. W. N83-29520
ZHENG, Q. N83-30106
ZIED, A. N83-29291
N83-30299
ZILSKE, W. N83-29347
ZIMMER, H. N83-29184
ZIN, W. C. N83-29396
ZIRROLLI, J. A. N83-29870
ZITKA, B. H. N83-30162
ZIZELMAN, J. N83-29218
ZIZKA, E. N83-29601
ZOBRIST, A. L. N83-29749
ZRNIC, D. S. N83-29929
ZUBKOV, V. N83-29281
ZUCK, N. N83-30078
ZUCKERWAR, A. J. N83-29783
ZWIBEL, H. S. N83-29825
ZWICKE, P. E. N83-29271

CORPORATE SOURCE INDEX

Typical Corporate Source Index Listing



Listings in this index are arranged alphabetically by corporate source. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The NASA accession number denotes the number by which the citation is identified. The titles are arranged under each corporate source in ascending accession number order.

A

ACADEMY OF SCIENCES OF THE UKRAINIAN SSR, KHARKOV (USSR).
Effect of large-scale anisotropic refractive index inhomogeneities on the strength of the coherent VHF signal component beyond the horizon N83-29557

ACADEMY OF SCIENCES (USSR), MOSCOW.
Globular clusters and X-ray bursters
[PR-764] N83-30333
Formation of universes in spaces of varying dimensionality
[PR-775] N83-30334
Phenomenological model of the nucleus of the galaxy
[PR-728] N83-30335

ADVANCED INFORMATION AND DECISION SYSTEMS, MOUNTAIN VIEW, CALIF.
Advanced tools for software maintenance
[AD-A126146] N83-30071
Distributed decision making environment
[AD-A126021] N83-30099

ADVISORY GROUP FOR AEROSPACE RESEARCH AND DEVELOPMENT, NEUILLY-SUR-SEINE (FRANCE).
Engine Handling
[AGARD-CP-324] N83-29241
Flight test experience on military aircraft engine handling N83-29248
Survey of missile simulation and flight mechanics facilities in NATO
[AGARD-AG-279] N83-29276
Proceedings of the AGARD Fluid Dynamics Specialists Meeting on Wall Interference in Wind Tunnels
[AGARD-AR-190] N83-29277

AEG-TELEFUNKEN, HEILBRONN (WEST GERMANY).
Integrated circuits for optical sensing and display techniques
[BMFT-FB-T-83-052] N83-29622
MOS-transistors for power applications
[BMFT-FB-T-83-059] N83-29623

AERODYNE RESEARCH, INC., BILLERICA, MASS.
Generalized matched filters
[AD-A126319] N83-29606

AEROJET ENERGY CONVERSION CO., SACRAMENTO, CALIF.
Hydrodynamic/kinetic reactions in liquid-dominated geothermal systems
[DE82-017287] N83-29814

AEROPLANE AND ARMAMENT EXPERIMENTAL ESTABLISHMENT, BOSCOMBE DOWN (ENGLAND).
The criteria used for assessing acceptable engine handling on UK military aircraft N83-29244

AEROSPACE CORP., EL SEGUNDO, CALIF.
Nonequilibrium disclinations in the carbonaceous mesophase
[AD-A125807] N83-29395
Performance of laser beam wavefront sensor
[AD-A125432] N83-29691

AGFA-GEVAERT A.G., MUNICH (WEST GERMANY).
Automatic focussing devices for photographic cameras
[PB83-155275] N83-29674

AIR FORCE ACADEMY, COLO.
Infrared detection of microwave induced surface currents on flat plates
[AD-A126207] N83-30227

AIR FORCE ENGINEERING AND SERVICES CENTER, TYNDALL AFB, FLA.
Environmental fate of hydrazine fuels in aqueous and soil environments
[AD-A125813] N83-29870

AIR FORCE ENVIRONMENTAL TECHNICAL APPLICATIONS CENTER, SCOTT AFB, ILL.
Cape Canaveral, Florida range reference atmosphere 0-70 km altitude
[NASA-TM-85253] N83-29935

AIR FORCE HUMAN RESOURCES LAB., BROOKS AFB, TEX.
PRISM: A general purpose programming system
[AD-A126228] N83-30067

AIR FORCE INST. OF TECH., WRIGHT-PATTERSON AFB, OHIO.
Third order polarization for multifrequency coherent anti-Stokes Raman scattering
[AD-A125434] N83-29330
Continued development of the Universal Network Interface Device
[AD-A126031] N83-29569

AIR FORCE OCCUPATIONAL AND ENVIRONMENTAL HEALTH LAB., BROOKS AFB, TEX.
Propellant handler's ensemble in-suit noise measurements
[AD-A125507] N83-30040

AIR FORCE ROCKET PROPULSION LAB., EDWARDS AFB, CALIF.
AFRPL technical objective document FY 84
[AD-A125495] N83-29309

AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AFB, OHIO.
Gas turbines for the production of electrical and thermal energy
[AD-A126182] N83-29239
Defense against space weapons
[AD-A126159] N83-29279
The duration period of propellants for classical and rocket armament
[AD-A126219] N83-29417
A FDM master-group signal encoding equipment
[AD-A126158] N83-29566
Data transmission systems
[AD-A126168] N83-29584
Current density in cathode spots in the condensed discharge
[AD-A126221] N83-29601
Electronic equipment in multiple access information systems
[AD-A126169] N83-29612
Selection of repetition frequencies for laser rangefinders
[AD-A126188] N83-29695
A clinical psychological study of inverted visual field by inversing prisms
[AD-A126220] N83-30010
Czechoslovak Journal of Physics (selected articles)
[AD-A126183] N83-30162
Fiber optics in aircraft applications
[AD-A126165] N83-30230

AIR FORCE WRIGHT AERONAUTICAL LABS., WRIGHT-PATTERSON AFB, OHIO.
Vibration and aeroelastic facility
[AD-A126317] N83-29275

AIRESEARCH MFG. CO., TORRANCE, CALIF.
Development of a solar-desiccant dehumidifier, phase 2
[DE83-005407] N83-29829

AKRON UNIV., OHIO.
Latex improvement of recycled asphalt pavement
[PB83-152694] N83-29460

ALABAMA UNIV., BIRMINGHAM.
Response of combined electrical stimulation and biodegradable ceramics
[AD-A126300] N83-29401

ALABAMA UNIV., UNIVERSITY.
Effects of uranium oxides on some of the algae native to Eglin Air Force Base, Florida
[AD-A125478] N83-29970

ALBERTA UNIV., EDMONTON.
A new perturbation expansion for electromagnetic scattering by stochastic surfaces N83-29536

ALEXANDRIA UNIV. (EGYPT).
Prediction of rain attenuation based on point rain rate statistics for Alexandria, Egypt N83-29525
Measurements of long term radar sea clutter statistics N83-29538

ALLIED CHEMICAL CORP., MORRISTOWN, N.J.
Solar assisted gas-fired absorption heat pump
[PB83-167502] N83-29477

ALPHA OMEGA GROUP, INC., HARVARD, MASS.
Functional specifications for a federal information processing standard data dictionary system
[PB83-169441] N83-30049

AMERICAN GAS ASSOCIATION LABS., CLEVELAND, OHIO.
Pulse combustion residential water heater
[PB83-167221] N83-29480

AMES LAB., IOWA.
Performance of Living History Farm's salt-gradient solar pond
[DE83-009066] N83-29839
Structures and polarized electronic absorption spectra of dimolybdenum tetraformate crystals
[DE83-004863] N83-30281

ANALYTIC SCIENCES CORP., READING, MASS.
MX systems study
[AD-A126083] N83-29296

ANALYTICAL MECHANICS ASSOCIATES, INC., MOUNTAIN VIEW, CALIF.
Modeling of the Mode S tracking system in support of aircraft safety research
[NASA-CR-166486] N83-29186
OPTIM: Computer program to generate a vertical profile which minimizes aircraft fuel burn or direct operating cost. User's guide
[NASA-CR-166061] N83-30061
TRAGEN: Computer program to simulate an aircraft steered to follow a specified verticle profile. User's guide
[NASA-CR-166062] N83-30062

APPLIED PHYSICS LAB., JOHNS HOPKINS UNIV., LAUREL, MD.
Graphite ablation in several gas environments
[AD-A125511] N83-29319
Radar modeling of space diversity associated with slant path rain attenuation at variable path angles, frequencies, and drop size distributions N83-29551
Diagrams for the free energy and density weight factors of the Ising models
[AD-A126295] N83-30278
Solar observations during Skylab, April 1973 - February 1974. 1: Coronal X-ray structure. 2: Solar flare activity
[NASA-CR-172824] N83-30348

ARGONAUT ENTERPRISES, DENVER, COLO.
Remote-reference magnetotelluric survey, Nevada test site and vicinity, Nevada and California
[DE82-019412] N83-29909

ARGONNE NATIONAL LAB., IDAHO FALLS, IDAHO.
Oxygen and titanium sputtering yields as determined by laser fluorescence and Auger electron spectroscopy for monolayer oxygen coverage of polycrystalline Ti
[DE83-007683] N83-29373

ARGONNE NATIONAL LAB., ILL.
Accelerator mass spectrometry: From nuclear physics to dating
[DE83-007863] N83-29342
Radiation-induced microstructural changes in Ni-C and Pt-C alloys
[DE83-007815] N83-29371
Thermally stratified tanks
[DE83-009089] N83-29641

High-resolution laser and rf spectroscopy of atomic and molecular beams
[DE83-008942] N83-29699
OTEC plants for todays island market
[DE83-008670] N83-29847
Calculation of unsaturated hydraulic conductivity
[DE82-016325] N83-29876
Nuclear structure in pion scattering and charge exchange
[DE83-007945] N83-30205
Focusing and imaging sharp line X-ray and gamma-ray sources using variable-metric diffraction crystals
[DE83-007789] N83-30285

ARIZONA STATE UNIV., TEMPE.
Modeling of fluctuating mass flux in variable density flows N83-29224
Thermionic-emission microscopy of polycrystalline molybdenum and Mo-LaCrO-3
[DE83-006596] N83-30284

ARIZONA UNIV., TUCSON.
Convective heat transfer in internal gas flows with temperature-dependent properties
[AD-A125901] N83-29640
Statistical summaries of fatigue data for design purposes
[NASA-CR-3697] N83-29731
Application of advanced reliability methods to local strain fatigue analysis
[NASA-CR-168198] N83-29734
In-progress absolute radiometric inflight calibration of the LANDSAT-4 sensors N83-29763
Use of a priori information for improved tomographic imaging in coded-aperture systems N83-30220
Entropy and information in the design and analysis of imaging systems N83-30221

ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, ABERDEEN PROVING GROUND, MD.
Experimental aerodynamic facilities of the Aerodynamics Research and Concepts Assistance Section
[AD-A126272] N83-29274
Scattering by spheroidal and rough particles
[AD-A125767] N83-29558

ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, DOVER, N. J.
Sensitivity characterization of low vulnerability (LOVA) propellants
[AD-A126130] N83-29415

ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, WATERVLIET, N. Y.
Stress intensity factors for radial cracks in a pre-stressed, thick-walled cylinder of strain-hardening materials
[AD-A125552] N83-29736

ARMY AVIATION ENGINEERING FLIGHT ACTIVITY, EDWARDS AFB, CALIF.
Airworthiness and Flight Characteristics test (A&FC) of AH-1S with Aircraft General Purpose Dispenser System (AGPDS)
[AD-A125978] N83-29199
Validation flight test of UH-60A for Rotorcraft Systems Integration Simulator (RSIS)
[AD-A125428] N83-29201

ARMY COLD REGIONS RESEARCH AND ENGINEERING LAB., HANOVER, N. H.
Analysis of roof snow load case studies: Uniform loads
[AD-A126330] N83-29455

ARMY ENGINEER WATERWAYS EXPERIMENT STATION, VICKSBURG, MISS.
Cavity detection and delineation research. Part 4: Microgravimetric survey: Manatee Springs Site, Florida
[AD-A125900] N83-29906
Tidal inlet response to jetty construction
[AD-A112448] N83-29950
A numerical model for wind-wave prediction in deep water
[AD-A125985] N83-29957

ARMY INDUSTRIAL BASE ENGINEERING ACTIVITY, ROCK ISLAND, ILL.
DARCOM metal removal working group
[AD-A126054] N83-29451

ARMY MATERIEL DEVELOPMENT AND READINESS COMMAND, TOBYHANNA, PA.
Evaluation of in-package performance of antistatic materials
[AD-A126118] N83-29714

ARMY MISSILE COMMAND, REDSTONE ARSENAL, ALA.
Detection criteria for a radar using coincidence processing
[AD-A126131] N83-29565

ARMY MOBILITY EQUIPMENT RESEARCH AND DEVELOPMENT CENTER, FORT BELVOIR, VA.
Materials compatibility studies with fuel/alcohol mixtures
[AD-A126076] N83-29416

ARMY RESEARCH INST. OF ENVIRONMENTAL MEDICINE, NATICK, MASS.
Procedures for the measurement of acute mountain sickness
[AD-A126280] N83-29995
Chronic consumption of a low sodium diet: Hormonal and physiological effects during exercise in the heat
[AD-A124936] N83-29997
Survey and analysis of the heat casualty prevention experiment for Resphiblex 1-81, operation 'Lancer Eagle', 43D, MAU
[AD-A125847] N83-30004

ARO, INC., ARNOLD AIR FORCE STATION, TENN.
Techniques for determining engine stall recovery characteristics N83-29265
Pressure altitude tests of the Army AN/MSQ-114 control terminal
[AD-A125524] N83-29572

ATMOSPHERIC AND ENVIRONMENTAL RESEARCH, INC., CAMBRIDGE, MASS.
Remote sensing of surface propagation parameters: Application of imagery simulation model results
[AD-A125513] N83-29785
Io escape and ionization of atmospheric gases
[NASA-CR-172885] N83-30336

AVCO SYSTEMS DIV., WILMINGTON, MASS.
A composite-flywheel burst-containment study
[DE82-014138] N83-29865

B

BALLISTIC RESEARCH LABS., ABERDEEN PROVING GROUND, MD.
Exact probability levels for multisample SMIRNOV-TYPE statistics
[AD-A126104] N83-30152

BATTELLE COLUMBUS LABS., OHIO.
Organic geochemistry of deep ground waters
[DE83-005333] N83-29787
Guidance and actuation techniques for an adaptively controlled vehicle
[AD-A126296] N83-30037

BATTELLE PACIFIC NORTHWEST LABS., RICHLAND, WASH.
Research to develop and evaluate advanced eddy current sensors for detecting small flaws in metallic aerospace components
[AD-A125873] N83-29726
An assessment of second-generation compressed-air energy-storage concepts
[DE82-019513] N83-29859

BEDFORD RESEARCH ASSOCIATES, MASS.
Investigate and develop mathematical formulas in support of atmospheric studies
[AD-A125869] N83-29897

BEERS ASSOCIATES, INC., RESTON, VA.
UV emissions and the electron density in the auroral and low to mid-latitude daytime ionospheres
[AD-A126318] N83-29901

BEND RESEARCH, INC., OREG.
Countercurrent reverse osmosis for ethanol-water separation
[DE83-009725] N83-29333

BENDIX FIELD ENGINEERING CORP., GRAND JUNCTION, COLO.
Hydrogeochemical and stream sediment reconnaissance basic data for Bangor and Bath quadrangles, Maine
[DE83-005630] N83-29788
Application of NURE data to the study of crystalline rocks in the Wyoming uranium province
[DE83-008323] N83-29914

BERNARD BARUCH COLL., NEW YORK.
Brain responses and information processing 3: Hemispheric asymmetry in event related potentials and performance during discrimination of line orientation and velocity of motion
[AD-A125681] N83-30011

BIONETICS CORP., HAMPTON, VA.
Characteristics of the transmission loss apparatus at NASA Langley Research Center
[NASA-CR-172153] N83-30165

BOEING AEROSPACE CO., SEATTLE, WASH.
Solar project description. Houston Construction Company single family residence, Eden Prairie, Minnesota March 19, 1982
[DE82-012337] N83-29456

BOEING COMPUTER SERVICES, INC., SEATTLE, WASH.
Intermediate photovoltaic system application experiment operational performance report for G. N. Wilcox Memorial Hospital, Kauai, Hawaii for October 1982, volume 6
[DE83-006415] N83-29834
Intermediate photovoltaic system application experiment operational performance report. Volume 6: CDC Light Manufacturing Bldg., San Bernardino, CA for August 1982
[DE83-010390] N83-29844
Intermediate photovoltaic system application experiment operational performance report. Lovington Square Shopping Center, Lovington, New Mexico for November 1982, volume 17
[DE83-006721] N83-29849

BOEING ENGINEERING AND CONSTRUCTION CO., SEATTLE, WASH.
Mod-2 wind turbine system development. Volume 1: Executive summary
[NASA-CR-168006] N83-29812

BOLT, BERANEK, AND NEWMAN, INC., CAMBRIDGE, MASS.
SATNET development and operation, Pluribus Satellite IMP development, Internet operations and maintenance, Mobile Access Terminal Network
[AD-A125959] N83-29563
Display-control compatibility in 3-D displays. 2: Effects of cue symmetry
[AD-A125806] N83-30036
Requirements for natural language understanding in a system with graphic displays
[AD-A126065] N83-30072

BOOZ-ALLEN AND HAMILTON, INC., BETHESDA, MD.
Assessment of residential passive solar/gas-fired energy systems
[PB83-167239] N83-29479

BRADFORD UNIV. (ENGLAND).
Cross polarisation on terrestrial microwave links during clear weather N83-29527
Influence of raindrop oscillations on coherent forward scattering of microwaves in rain N83-29528

BRANDEIS UNIV., WALTHAM, MASS.
Actionometry in monochromatic flash photolysis: The extinction coefficient of triplet benzophenone and quantum yield of triplet zinc tetraphenyl porphyrin
[DE83-006819] N83-29345

BRITISH COLUMBIA UNIV., VANCOUVER.
Analysis of multipath fading observations on certain microwave paths in British Columbia N83-29498

BROOKHAVEN NATIONAL LAB., UPTON, N. Y.
Investigation of the conservatism associated with different combinations between primary and secondary piping responses
[DE83-007417] N83-29740
Studies of the gas- and aqueous-phase composition of stratiform clouds
[DE83-005912] N83-29872
Cloudwater acidity measurements and formation mechanisms: Experimental design
[DE83-005911] N83-29874
Facility for in-vivo measurement of lithium
[DE83-007388] N83-30006
Measures of value in a linear-programming model of the US energy system
[DE83-006685] N83-30087
Higgs mass scales and matter-anti-matter oscillations in grand unified theories
[DE82-017638] N83-30294

BROWN UNIV., PROVIDENCE, R. I.
Characterization of tar products from rapid pyrolysis of bituminous coals
[DE83-007272] N83-29346
Propagation elastic-plastic fields: Asymptotic analysis of plane strain crack growth and restrictions on moving surfaces of strong discontinuity
[DE82-018820] N83-29737
Electromagnetic deep-probing (100-1000 kms) of the Earth's interior from artificial satellites: Constraints on the regional emplacement of crustal resources
[E83-10363] N83-29774
A recursive estimator and stability of a class of time varying difference equations
[PB83-167213] N83-30138

BUREAU OF MINES, DENVER, COLO.
Platinum availability - market economy countries: A minerals availability system appraisal
[PB83-156869] N83-29385

BUREAU OF MINES, PITTSBURGH, PA.
Electromagnetic surface fields due to a magnetic dipole buried in a three-layered Earth. Report of investigations, 1982
[PB83-148064] N83-29799

BUREAU OF MINES, RENO, NEV.
Recovery of tungsten from a hydrothermally altered deposit. Report of investigations, 1982
[PB83-157719] N83-29381
Recovery of sulfur and accessory metals from a leaching process residue
[PB83-157651] N83-29383

BUREAU OF MINES, ROLLA, MO.
In-plant recycling of stainless and other specialty steelmaking wastes. Report on investigations, 1982
[PB83-157701] N83-29382

BUREAU OF MINES, SALT LAKE CITY, UTAH.
Line-sinter processing of anorthosite for the recovery of alumina
[PB83-148435] N83-29379

BUREAU OF MINES, UNIVERSITY, ALA.
Influence of selected additives and CaO:SiO2 ratio on high-temperature strength of MgO refractories
[PB83-157875] N83-29410

BURK AND ASSOCIATES, INC., NEW ORLEANS, LA.
Mississippi Deltaic Plain Region ecological characterization: An ecological atlas. Map narratives
[PB83-157669] N83-29890

C

CALIFORNIA INST. OF TECH., PASADENA.
Unsteady flow effects in combustor systems N83-29232
Prediction of flow depth and sediment discharge in open channels
[PB83-165696] N83-29468
A simple derivation of the formula to calculated synthetic long-period seismograms in a heterogeneous Earth by normal mode summation
[NASA-CR-172818] N83-29893

CALIFORNIA UNIV., BERKELEY.
Numerical modeling of turbulent combustion N83-29233
States of the art and practice in the optimum seismic design and analytical response prediction of r/c frame-wall structures
[PB83-147736] N83-29465
An evaluation of the design and analytical seismic response of a seven-story reinforced concrete frame-wall structure
[PB83-157628] N83-29470
Mechanical behavior of shear wall vertical boundary members: An experimental investigation
[PB83-159764] N83-29742
CELSS system control overview N83-30019
An O(/E/) time algorithm for computing the reliability of a class of directed networks
[PB83-167197] N83-30159

CALIFORNIA UNIV., BERKELEY. LAWRENCE BERKELEY LAB.
Metal coordination chemistry: Removal and recovery of metal compounds from heavy crude and shale oils with multidentate ligands
[DE83-006912] N83-29343
Circular differential scattering is an important part of the circular dichroism of macromolecules
[DE83-007022] N83-29405
Design analysis and performance evaluation of a two-dimensional camera for accelerated positron-emitter beam injection by computer simulation
[DE83-005866] N83-29661
Oil from plants
[DE83-009141] N83-29846
Correlation between precision gravity and subsidence measurements at Cerro Prieto
[DE83-005870] N83-29907
Formation of quark-gluon plasma in nuclear collisions
[DE82-018521] N83-30184
Neutral-particle-beam production and injection
[DE83-006966] N83-30201
Density and potential measurements in an intense ion-beam-generated plasma
[DE82-018803] N83-30248

CALIFORNIA UNIV., DAVIS.
Continuous production of ethanol and chemical byproducts
[DE83-009667] N83-29421
Synfuel from fusion: Using the tandem mirror reactor and a thermochemical cycle to produce hydrogen
[DE83-005216] N83-29424
Selection of crop varieties for efficient production using urea, ammonia, nitrite, and nitrate in cells N83-30025

CALIFORNIA UNIV., IRVINE.
Effect of liquid droplets on turbulence structure in a round gaseous jet N83-29215

CALIFORNIA UNIV., LIVERMORE. LAWRENCE LIVERMORE LAB.
Protecting against failure by brittle fracture in ferritic-steel shipping containers greater than 4 inches thick
[DE83-007462] N83-29372
Synthesis and characterization of a new silicone multiblock polymer
[DE82-015189] N83-29406
Synfuel from fusion: Using the tandem mirror reactor and a thermochemical cycle to produce hydrogen
[DE83-005216] N83-29424
Toward a metrology for precision-machine-tool control systems
[DE82-018077] N83-29458
An investigation of the basic characteristics of the radiation of straight xenon flash tubes
[DE82-016680] N83-29614
Estimates of air-column density evolution behind strong airblasts
[DE82-018313] N83-29645
Blast attenuation in a shot tunnel using water jets
[DE82-018508] N83-29646
Design of neutron streak camera for fusion diagnostics
[DE82-018393] N83-29662
Investigations of other operating points for the RCA streak tube in the Lawrence Livermore National Laboratory streak camera
[DE82-019065] N83-29663
Executive committee report: Geotechnical instrumentation working group meeting
[DE82-012837] N83-29664
Some signal-processing issues in radar-target identification
[DE83-006554] N83-29698
Lasers in chemical processing
[DE82-016134] N83-29700
Computer simulation of concrete penetration by shaped-charged jets
[DE83-007359] N83-29720
Characterization of material flaws using ultrasonic ramp responses
[DE83-006123] N83-29727
Metal-air battery research and development
[DE82-019881] N83-29864
A composite-flywheel burst-containment study
[DE82-014138] N83-29865
Cross-borehole fracture mapping using electromagnetic geotomography
[DE82-012699] N83-29910
Step cracks: Theory, experiment, and field observation
[DE82-014558] N83-29911
Mechanical, thermal, and fluid transport properties of rock at depth
[DE82-016008] N83-29912
FDAS EPROM programming manual
[DE82-019229] N83-30085
Image-enhancement applications at the Lawrence Livermore National Laboratory
[DE82-019312] N83-30086
The application of Monte Carlo codes to neutron dosimetry
[DE82-017635] N83-30154
A review of quantum Monte Carlo methods and results for Coulombic systems
[DE83-006570] N83-30155
Incorporation of high level wastes in SYNROC: Results from recent process engineering studies at Lawrence Livermore National Laboratory
[DE82-013402] N83-30214
An inductive-store, pulsed power source
[DE82-015443] N83-30216
Optical-scattering measurements from 1.06-micron, 0.53-micron, and 0.35-micron laser-heated disk targets
[DE82-015418] N83-30232
Studying electron distributions using the time-resolved free-bound spectra from coronal plasmas
[DE83-006569] N83-30241
Time-resolved X-ray line diagnostics of laser-produced plasmas
[DE82-015165] N83-30249
Inertial fusion: An energy-production option for the future
[DE82-019245] N83-30250
Preliminary conceptual design study of a suppressed-fission Tokamak hybrid
[DE83-008428] N83-30255
Theoretical modeling of EMP effects in semiconductor junction devices
[AD-A125976] N83-30273
Management of reference information services: A dynamic resource allocation and simulation model
[DE82-019879] N83-30312
Summary of rules for sampling, decimation, and interpolation of experimental data
[DE82-016360] N83-30313

CALIFORNIA UNIV., LOS ANGELES.
Wavelength scaling of the two-plasmon decay and stimulated Raman-scattering instabilities
[DE83-007905] N83-30202

CALIFORNIA UNIV., SAN DIEGO.
Natural artifical languages: Low-level processes
[AD-A125800] N83-30063

CALIFORNIA UNIV., SAN DIEGO, LA JOLLA.
Molecular beam studies of low energy reactions
[AD-A126091] N83-30177

CAMBRIDGE COLLABORATIVE, INC., MASS.
Development of rotorcraft interior. Noise control concepts. Phase 1: Definition study
[NASA-CR-166101] N83-30166

CAMBRIDGE UNIV. (ENGLAND).
Color Vision Conference
[AD-A125435] N83-30001

CARLETON UNIV., OTTAWA (ONTARIO).
An overview of engine dynamic response and mathematical modeling concepts N83-29262

CARNEGIE-MELLON UNIV., PITTSBURGH, PA.
Delayed binding in PQCC generated compilers
[AD-A125935] N83-30044
Specifying reliability as a software attribute
[AD-A125934] N83-30075
Local code generation and compaction in optimizing microcode compilers
[AD-A126026] N83-30076
Resource sharing in a network of personal computers
[AD-A126003] N83-30096
Submodular set functions, matroids and the greedy algorithm: Tight worst-case bounds and some generalizations of the Rado-Edmonds theorem
[AD-A124981] N83-30134
Invariant multiplicative efficiency and piecewise Cobb-Douglas envelopments
[AD-A126239] N83-30157

CASE WESTERN RESERVE UNIV., CLEVELAND, OHIO.
Dilution jet experiments in compact combustor configurations N83-29218

CATHOLIC UNIV., RIO DE JANEIRO (BRAZIL).
Measurements of radio refractive index profiles in tropical and equatorial regions and their influence on line of sight microwave links N83-29503
An analytical and numerical comparison between two rain attenuation prediction methods for Earth-satellite paths N83-29524

CATHOLIC UNIV. OF AMERICA, WASHINGTON, D.C.
Diagrams for the free energy and density weight factors of the Ising models
[AD-A126295] N83-30278

CENTRAL INST. FOR INDUSTRIAL RESEARCH, OSLO (NORWAY).
Superacids as catalysts for selected hydrocarbon convers
[PB83-166546] N83-29353

CENTRE NATIONAL D'ETUDES DES TELECOMMUNICATIONS, ISSY-LES-MOULINEAUX (FRANCE).
The PACEM experiment on line of sight multipath propagation N83-29499
Propagation anomalies in a 4.7 and 11 GHz line of sight path N83-29504
Theoretical and experimental investigation of propagation attenuation by equatorial and tropical precipitation N83-29519
Uncertainties in estimating worst month statistics for Earth-space links influenced by rain N83-29523

CENTRE NATIONAL D'ETUDES DES TELECOMMUNICATIONS, LANNION (FRANCE).
Rates of change of propagation medium transfer functions during selective fadings N83-29501

CENTRO STUDI E LABORATORI TELECOMUNICAZIONI, TURIN (ITALY).
Propagation characteristics at 35 and 78 GHz for spaceborne altimeters N83-29546

CHEM SYSTEMS, INC., FAIRFIELD, N.J.
Development of alcohol-based synthetic transportation fuels from coal-derived synthesis gases
[DE83-004857] N83-29434

CHICAGO UNIV., ILL.
Molecular biology of environmental aromatic hydrocarbons
[DE82-016978] N83-29875

CH2M/HILL, INC., CORVALLIS, OREG.
Sensing systems for measuring mechanical properties in ground masses. Volume 4: Static penetrometer
[PB83-155978] N83-29794

CINCINNATI UNIV., OHIO.
Phase equilibria and transition in mixtures of a homopolymer and a block copolymer. 1: Small-angle X-ray scattering study
[AD-A125818] N83-29396

CIVIL AEROMEDICAL INST., OKLAHOMA CITY, OKLA.
Effects of some motion sickness suppressants on tracking performance during angular accelerations
[AD-A123839] N83-29984

CLARKSON COLL. OF TECHNOLOGY, POTSDAM, N.Y.
Scattering and absorption by atmospheric aerosol models N83-29542

CLEVELAND STATE UNIV., OHIO.
Vibration in planetary gear systems with unequal planet stiffnesses
[NASA-TM-83428] N83-29709

COLLEGE OF AERONAUTICS, CRANFIELD (ENGLAND).
Spray impaction, retention and adhesion: An introduction to basis characteristics
[CA-8215] N83-29394
Design and development of a disc-windmill atomizer for aerial applications
[AE-8223] N83-29449
Atomizers for the aerial application of herbicides: Ideal and available
[CA-8207] N83-29632
Non-steady gas dynamic effects in the induction domain behind a strong shock wave
[CA-8229] N83-29633
COLLEGE OF WILLIAM AND MARY, WILLIAMSBURG, VA.
Thresholds for the onset of fluid and magnetofluid turbulence
[DE82-017202] N83-29642
Major disruptions, inverse cascades and the Strauss equations
[DE82-017188] N83-30252
COLORADO SCHOOL OF MINES, GOLDEN.
Mechanisms and kinetics of coal hydrogenation
[DE82-016296] N83-29331
Liquid-vapor equilibria for ternary natural gas systems
[PB83-173419] N83-29350
COLORADO STATE UNIV., FORT COLLINS.
Cross-linking reactions of thermally stable high performance polymers
[AD-A125967] N83-29397
COMMAND AND CONTROL TECHNICAL CENTER, WASHINGTON, D. C.
Generalized monitoring facility. Users manual, change 4: Computer system manual
[AD-A126234] N83-30068
Generalized monitoring facility. Users manual, change 5: Computer system manual
[AD-A126235] N83-30069
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION (U. S. SENATE).
National Aeronautics and Space Administration Authorization Act, 1983 N83-30324
COMMITTEE ON ENERGY AND COMMERCE (U. S. HOUSE).
Methanol as an alternate transportation fuel
[GPO-12-626] N83-29412
US Synthetic Fuels Corporation and National Synfuels Policy
[GPO-96-481] N83-29413
COMMITTEE ON GOVERNMENTAL AFFAIRS (U. S. SENATE).
Oversight of Department of Energy research and development facilities
[GPO-99-908] N83-29807
COMMITTEE ON SCIENCE AND TECHNOLOGY (U. S. HOUSE).
Fusion Energy Workshop
[PUBL-97-128] N83-30236
Engineering and Science Manpower Act of 1982
[GPO-96-196] N83-30323
COMMITTEE ON SPACE RESEARCH, BERLIN (EAST GERMANY).
Space research activities in the German Democratic Republic N83-29743
COMMITTEE ON THE JUDICIARY (U. S. HOUSE).
Air disaster litigation
[GPO-97-336] N83-29185
COMMUNICATIONS RESEARCH CENTRE, OTTAWA (ONTARIO).
Attenuation by rain on Earth-space paths at 13 GHz N83-29512
COMMUNICATIONS SATELLITE CORP., CLARKSBURG, MD.
Study of high power L-band space transmitters for 2nd generation INMARSAT
[SCR-518(PSL-83-159)] N83-29490
COMPUTER CORP. OF AMERICA, CAMBRIDGE, MASS.
CODASYL Query Language Flat (CQLF) specifications
[PB83-164376] N83-30088
COMPUTER SCIENCES CORP., SILVER SPRING, MD.
Application of SEASAT-1 Synthetic Aperture Radar (SAR) data to enhance and detect geological lineaments and to assist LANDSAT landcover classification mapping
[E83-10365] N83-29776
CONNECTICUT UNIV., STORRS.
Generating natural language explanations in a computer-aided design system
[AD-A126190] N83-30079
COPENHAGEN UNIV. (DENMARK).
Probing the nuclear structure with heavy-ion reactions
[DE82-017316] N83-30195
CORNELL UNIV., ITHACA, N. Y.
A theory of rotating stall of multistage axial compressors
[NASA-CR-3685] N83-29175
Behavior and design of reinforced concrete column-type lapped splices subjected to high-intensity cyclic loading
[PB83-165134] N83-29474
Search for far infrared radiation from optically pumped defect modes
[AD-A125940] N83-29685
Remote sensing program
[E83-10304] N83-29745
COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH, PRETORIA (SOUTH AFRICA).
Plastics in the 80's
[PB83-163311] N83-29409
CRAMER (H.E.) CO., INC., SALT LAKE CITY, UTAH.
User's instructions for the SHORTZ and LONGZ computer programs, volume 1
[PB83-146100] N83-30093
User's instructions for the SHORTZ and LONGZ computer programs, volume 2
[PB83-146092] N83-30094
CRANFIELD INST. OF TECH., BEDFORDSHIRE (ENGLAND).
Alternative fuel technology series. Volume 2: Comparative properties of conventional and alternative fuels
[ISBN-0-902937-66-9] N83-29411
Alternative fuel technology series. Volume 1: Alternative fuels for transport
[ISBN-0-902937-63-4] N83-29414

D

DAMANS AND ASSOCIATES, INC., GAITHERSBURG, MD.
Integration of new technology in Army libraries
[AD-A125983] N83-30307
Integration of new technology in Army libraries, appendices
[AD-A125984] N83-30308
DATA RESOURCES, INC., LEXINGTON, MASS.
Residential demand for energy. Volume 1: Residential energy demand in the US
[DE82-903277] N83-29818
DAVIDSON (HAROLD F.), FAIRFAX, VA.
Department of Defense in-house RDT and E (Research Development Test and Evaluation) activities
[AD-A125498] N83-30302
DAYTON UNIV., OHIO.
Investigation of crew restraint system biomechanics
[AD-A126199] N83-29190
Some vibration data on primates implanted with accelerometers on the upper and lower spine: Methodology and results in Rhesus monkeys
[AD-A125545] N83-29969
DECISION SCIENCE CONSORTIUM, INC., FALLS CHURCH, VA.
Towards a prescriptive organization theory of decision aiding for risk management. Phase 1: Conceptual development
[PB83-156109] N83-30304
DEFENCE AND CIVIL INST. OF ENVIRONMENTAL MEDICINE, DOWNSVIEW (ONTARIO).
Evaluation of high performance aircrew helmets and oxygen masks
[AD-A126036] N83-30038
DEFENCE RESEARCH INFORMATION CENTRE, ORPINGTON (ENGLAND).
Treatment of hypothermia in a seaman following the shipwreck of a coastal motorship
[DRIC-T-6835] N83-29988
DEFENSE INTELLIGENCE AGENCY, WASHINGTON, D.C.
Bibliography of Soviet laser developments, no. 55, September - October 1981
[AD-A126022] N83-29686
Bibliography of Soviet laser developments, no. 56, November - December 1981
[AD-A126023] N83-29687
DEFENSE MAPPING AGENCY AEROSPACE CENTER, ST. LOUIS, MO.
Interactive analysis of digital terrain elevation and surface feature data bases
[AD-A126310] N83-29784
DEFENSE MAPPING AGENCY HYDROGRAPHIC AND TOPOGRAPHIC CENTER, WASHINGTON, D.C.
Catalogue of 20457 star positions obtained by photography in the declination zone -48 deg to -54 deg (1950)
[AD-A126161] N83-30330
DEFENSE MAPPING SCHOOL, FORT BELVOIR, VA.
The influence of reference system disparity on navigation and positioning
[AD-A125546] N83-29195
DELAWARE UNIV., NEWARK.
Remote sensing investigations of wetland biomass and productivity for global biosystems research N83-29767
DENVER UNIV., COLO.
Preconcentration methods for trace element determination
[PB83-172536] N83-29351
DEPARTMENT OF ENERGY, WASHINGTON, D. C.
Demonstrated reserve base of coal in the United States on 1 January 1980
[DE83-006471] N83-29789
International energy indicators, February - March 1982
[DE82-014879] N83-29824
DEPARTMENT OF THE AIR FORCE, WASHINGTON, D.C.
USAF (United States Air Force) avionics master plan
[AD-A125819] N83-29205
DEPARTMENT OF THE ARMY, WASHINGTON, D. C.
Masonry structural design for buildings
[AD-A126314] N83-29452
DEPUTY CHIEF OF STAFF FOR RESEARCH DEVELOPMENT AND ACQUISITION (AIR FORCE), WASHINGTON, D.C.
Department of the Air Force supporting data for fiscal year 1984 budget estimates submitted to Congress, January 31, 1983. Descriptive summaries, research, development, test and evaluation
[AD-A125932] N83-30301
DESMATICS, INC., STATE COLLEGE, PA.
The effect of environmental change in single-subject experiments
[AD-A125779] N83-30150
DETROIT DIESEL ALLISON, INDIANAPOLIS, IND.
Small gas turbine combustor primary zone study N83-29221
Applications of a compression system stability model N83-29260
DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, BRUNSWICK (WEST GERMANY).
Evaluation of an airborne terminal for a digital data link in aviation
[DFVLR-FB-83-05] N83-29196
DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, OBERPFAFFENHOFEN (WEST GERMANY).
Wave scattering by random surfaces and application to natural surfaces N83-29497
Analytical nonsingular theory for geopotential perturbations including resonance effects
[DFVLR-FB-82-28] N83-29915
DEUTSCHE GOLD- UND SILBER-SCHEIDEANSTALT, FRANKFURT AM MAIN (WEST GERMANY).
Gas turbine parts made of injection molded silicon nitride
[BMFT-FB-T-83-021] N83-29240
Recovery of precious metals from cyanide solutions, plating baths and liquid residues from homogeneous catalysis processes
[BMFT-FB-T-83-030] N83-29347
Gas turbine parts made of injection molded silicon nitride and brazing of silicon nitride with metal
[BMFT-FB-T-83-028] N83-29377
DORNIER-WERKE G.M.B.H., FRIEDRICHSHAFEN (WEST GERMANY).
Design, construction and test of an experimental propeller in the power range 750 HP
[BMFT-FB-W-83-004] N83-29184
DREXEL UNIV., PHILADELPHIA, PA.
Pollutant formation in monodisperse fuel spray combustion N83-29213
A fundamental study of tool steels processed from rapidly solidified powders
[AD-A126163] N83-29362
DUKE UNIV., DURHAM, N. C.
The generation of near millimeter radiation by picosecond pulse demodulation
[AD-A125510] N83-29576
DYNAMIC SYSTEMS, INC., MCLEAN, VA.
Optical signal processing
[AD-A125609] N83-29599

E

EAGLE-PICHER INDUSTRIES, INC., SENECA, MO.
Maintenance-free 100 ampere-hour, lead acid battery for deep discharge, photovoltaic applications
[DE82-018633] N83-29821
EARTH SATELLITE CORP., WASHINGTON, D. C.
Mississippi Deltaic Plain Region ecological characterization: An ecological atlas. Map narratives
[PB83-157669] N83-29890
ECODYNAMICS RESEARCH ASSOCIATES, INC., ALBUQUERQUE, N. MEX.
Development of the GEM (General Elliptic Marching) package: User-oriented codes for general discretized elliptic and mixed partial differential equations
[AD-A125897] N83-30131

EDGERTON, GERMESHAUSEN AND GRIER, INC., IDAHO FALLS, IDAHO.
Process parameter effects on arc physics and heat flow in GTAW
[DE82-017269] N83-29717
Numerical calculations of ultrasonic fields
[DE82-013811] N83-30169
A process for locating shallow land-burial sites for low level radioactive waste
[DE83-008173] N83-30219

EDGERTON, GERMESHAUSEN AND GRIER, INC., SALEM, MASS.
Phase 2B prototype redesign, tactical rubidium frequency standard
[AD-A126320] N83-29658

EL PASO ELECTRIC CO., TEX.
Newman unit 1 advanced solar repowering advanced conceptual design
[DE82-014899] N83-29815
Newman unit 1 advanced solar repowering
[DE82-014898] N83-29816

ENERGY AND ENVIRONMENTAL RESEARCH CORP., IRVINE, CALIF.
Proceedings of the Fifth Fundamental Combustion Research Contractors Workshop
[PB83-164483] N83-29349

ENERGY INFORMATION ADMINISTRATION, WASHINGTON, D.C.
EIA Data Index: An abstract journal. Third supplement, Jul.-Dec. 1981
[DE83-006533] N83-30311

ENVIRONMENTAL MEASUREMENTS, INC. ARNOLD, MD.
Airborne field study of power plant plume dispersion in stable atmospheres
[PB83-168930] N83-29887

ENVIRONMENTAL PROTECTION AGENCY, ANN ARBOR, MICH.
Summary of status of Environmental Protection Agency (EPA), Office of Mobile Sources Characterization Projects as of March, 1982
[PB83-163972] N83-29441
Analysis of in-use fuel economy data, stage 1
[PB83-144162] N83-29721
Emissions and fuel economy of the Kat's engine block heater device
[PB83-165548] N83-29724

ENVIRONMENTAL PROTECTION AGENCY, RESEARCH TRIANGLE PARK, N.C.
National performance audit program: The 1980 proficiency survey for sulfur dioxide, nitrogen dioxide, carbon monoxide, sulfate, nitrate, lead and high volume flow
[PB83-164863] N83-29354
VOC (Volatile Organic Compound) fugitive emissions in petroleum refining industry: Background information for proposed standards
[PB83-157743] N83-29885
Gaseous continuous emission monitoring systems. Performance specification guidelines for SO2, NOx, CO2, O2 and TRS
[PB83-161646] N83-29886

ENVIRONMENTAL RESEARCH INST. OF MICHIGAN, ANN ARBOR.
The use of synthetic aperture radar to detect and chart submerged navigation hazards
[AD-A126071] N83-29567
Investigation of radiometric properties of LANDSAT-4 MSS N83-29758

ENVIRONMENTAL RESEARCH LAB., GULF BREEZE, FLA.
A perspective on the role of microcosms in environmental fate and effects assessments
[PB83-165530] N83-29889

ERNO RAUMFAHRTTECHNIK G.M.B.H., BREMEN (WEST GERMANY).
Vibration measurement and attenuation for Spacelab experiments of the D1 mission
[BMFT-FB-W-83-003] N83-29301
Fluid dynamic experiment in a surface tension tank: Phase 1/Phase 2A
[BMFT-FB-W-83-002] N83-29649

ESSEX CORP., HUNTSVILLE, ALA.
Satellite retrieval system
[NASA-CASE-MFS-25403-1] N83-29303

ESSEX UNIV., COLCHESTER (ENGLAND).
The dependency on the propagation environment of the frequency scaling of attenuation N83-29550

EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH, GENEVA (SWITZERLAND).
Neutrino oscillations: Present and future experiments
[DE82-903207] N83-30186

EUROPEAN SPACE AGENCY, PARIS (FRANCE).
Wave propagation and remote sensing
[ESA-SP-194] N83-29494

EUROPEAN SPACE RESEARCH AND TECHNOLOGY CENTER, NOORDWIJK (NETHERLANDS).
Backscattering and differential backscattering characteristics of the melting layer N83-29543
Radiative transfer in size-limited bodies N83-29544

EXXON RESEARCH AND ENGINEERING CO., LINDEN, N.J.
Present development status of Exxon's zinc-bromine battery for bulk energy storage
[DE82-013642] N83-29862

F

FEDERAL AVIATION ADMINISTRATION, ATLANTIC CITY, N.J.
A new characterization of supercooled clouds below 10,000 feet AGL (Above Ground Level)
[FAA-CT-83-22] N83-29922

FEDERAL AVIATION AGENCY, ATLANTIC CITY, N.J.
LORAN-C nonprecision approaches in the northeast corridor
[FAA-RD-82-78] N83-29192

FEDERAL HIGHWAY ADMINISTRATION, WASHINGTON, D.C.
Epoxy thermoplastic pavement marking material: Summary of research results and revised specifications
[PB83-164848] N83-29475

FEDERATION OF AMERICAN SOCIETIES FOR EXPERIMENTAL BIOLOGY, BETHESDA, MD.
Research opportunities in cardiovascular deconditioning, phase 1
[NASA-CR-3707] N83-29992
Research opportunities in space motion sickness, phase 2
[NASA-CR-3708] N83-29993

FERMI NATIONAL ACCELERATOR LAB., BATAVIA, ILL.
Polarized E + - polarized p colliding beams: Physics issues
[DE83-006645] N83-30295

FLORIDA STATE UNIV., GAINESVILLE.
Acidity, nutrients and minerals in atmospheric precipitation over Florida: Deposition patterns, mechanisms and ecological effects
[PB83-165837] N83-29888

FLORIDA STATE UNIV., TALLAHASSEE.
Mechanisms of stratospheric ozone transport N83-29892

FLORIDA UNIV., GAINESVILLE.
Satellite freeze forecast system: Executive summary
[E83-10368] N83-29778
Satellite freeze forecast system
[E83-10369] N83-29779
Satellite freeze forecast system. System configuration definition manual
[E83-10370] N83-29780
Satellite freeze forecast system. Operating/troubleshooting manual
[E83-10371] N83-29781
Satellite freeze forecast system. System software documentation manual
[E83-10372] N83-29782
Prediction of hurricane storm surges: A state-of-the-art survey
[PB83-163915] N83-29946

FORD AEROSPACE AND COMMUNICATIONS CORP., PALO ALTO, CALIF.
Spacecraft IF switch matrix for wideband service applications in 30/20 GHz communications satellite systems: Proof-of-concept model, executive summary
[NASA-CR-168175] N83-29492

FORSCHUNGSINSTITUT DER DEUTSCHEN BUNDESPOST, DARMSTADT (WEST GERMANY).
Results obtained from attenuation measurements of the Deutsche Bundespost OTS propagation experiment N83-29510
On the aperture illumination of multibeam satellite antennas
[FTZ-454-TBR-36] N83-29588
A fading simulator for frequency selective fading and measurements with a 34 Mbit/s QPSK modem
[FTZ-445-TBR-22] N83-29589

FORSCHUNGSINSTITUT FUER HOCHFREQUENZPHYSIK, WERTHHOVEN (WEST GERMANY).
Multistatic sonar with omnidirectional receivers
[REPT-10-82] N83-29486

FOSTER-MILLER ASSOCIATES, INC., WALTHAM, MASS.
Diesel exhaust-gas purification system
[DE82-019808] N83-29719

FOXBORO CO., BURLINGTON, MASS.
Wear particle atlas, revised
[AD-A125512] N83-29402

FRAUNHOFER-INST. FUER ANGEWANDTE FESTKOERPERPHYSIK, FREIBURG (WEST GERMANY).
Plasma etching, processes and diagnostic
[BMFT-FB-T-83-041] N83-30256

FRAUNHOFER-INST. FUER INFORMATIONS- UND DATENVERARBEITUNG, KARLSRUHE (WEST GERMANY).
Objective acoustic quality inspection by pattern recognition and signal analysis. Design of an inspection system and application to an electric motor
[BMFT-FB-T-83-005] N83-29619

FRENCH AIR FORCE, PARIS.
Handling combat engines: The pilots viewpoint N83-29247

G

GARRETT TURBINE ENGINE CO., PHOENIX, ARIZ.
Computations of emissions using a 3-D combustor program N83-29226

GCA CORP., BEDFORD, MASS.
Finalization of reports entitled Updated Acid Rain Information Book and Simplification Approaches to Protecting PSD Class I Areas
[DE83-008771] N83-29677

GENERAL ACCOUNTING OFFICE, WASHINGTON, D. C.
Army helicopter improvement program's future may depend on success in controlling cost
[PB83-168187] N83-29202

GENERAL ATOMIC CO., SAN DIEGO, CALIF.
Dye laser fluorescence spectroscopy on the doublet 3 Tokamak
[DE82-017575] N83-29338
Synfuel from fusion: Using the tandem mirror reactor and a thermochemical cycle to produce hydrogen
[DE83-005216] N83-29424
Theory of current drive with lower hybrid waves
[DE82-017216] N83-30243
Laser-fluorescence measurements of hydrogen and metal densities in the doublet 3 Tokamak
[DE83-008499] N83-30251
Theory of runaway-current sustainment by lower-hybrid waves
[DE82-017213] N83-30254

GENERAL DYNAMICS CORP., FORT WORTH, TEX.
SEM/TEM fractography of composite materials
[AD-A125832] N83-29317
Cumulative damage model for advanced composite materials
[AD-A126048] N83-29318

GENERAL ELECTRIC CO., BINGHAMTON, N.Y.
Magnetization of rare earth/cobalt permanent magnets subsequent to assembly in complex rotor structures
[AD-A126322] N83-30163

GENERAL ELECTRIC CO., EVENDALE, OHIO.
Modelling compression component stability characteristics: Effects of inlet distortion and fan bypass duct disturbances N83-29261

GENERAL ELECTRIC CO., PHILADELPHIA, PA.
Marine Biomass Program: Kelp biomass program summary
[PB83-167247] N83-29438

GENERAL ELECTRIC CO., SCHENECTADY, N. Y.
SEM (Scanning-Electron-Microscopy) studies of magnetic domains in amorphous metals
[AD-A126070] N83-29365
Applications of composite gas-turbine components, phase 1
[DE83-006574] N83-29718

GENERAL ELECTRIC CO., ST. PETERSBURG, FLA.
Compatability and accelerated aging study for Li(Si)FeS2 thermally activated batteries
[DE82-009026] N83-29817

GENERAL ELECTRIC CO., SYRACUSE, N.Y.
Heterodyne detector/electronics design and alignment of a pulsed CO2 laser wind system
[AD-A126264] N83-29682

GEOLOGICAL SURVEY, DENVER, COLO.
Geothermal-reservoir assessment and confirmation program for direct-heat applications in Colorado
[DE83-009816] N83-29836
Remote-reference magnetotelluric survey, Nevada test site and vicinity, Nevada and California
[DE82-019412] N83-29909

GEOLOGICAL SURVEY, FLAGSTAFF, ARIZ.
Thematic mapper intraband radiometric performance N83-29764

GEOLOGICAL SURVEY, RESTON, VA.
An evaluation of LANDSAT-4 thematic mapper data for their geometric and radiometric accuracies and their relevance to geologic mapping N83-29765

GEOLOGICAL SURVEY, SAN JUAN (PUERTO RICO).
Water resources data for Puerto Rico, 1979-1980
[PB83-159483] N83-29802

GEORGE WASHINGTON UNIV., WASHINGTON, D.C.
Publications of the exobiology program for 1982. A special bibliography
[NASA-TM-85837] N83-30041
GEORGIA INST. OF TECH., ATLANTA.
Measurement of pressure-velocity correlations in turbulent reacting flows N83-29628
To produce nutrients for plant growth N83-30027
Some issues in comparability of results and analytical methodology in CELSS waste processing research N83-30031
A minimal technology routing system
[AD-A126079] N83-30122
Spacefilling curves and routing problems in the plane
[AD-A126309] N83-30125
Locally one dimensional numerical methods for multi-dimensional free surface problems
[AD-A125902] N83-30133
GEORGIA UNIV., ATHENS.
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172906] N83-30054
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172901] N83-30057
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172902] N83-30058
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172903] N83-30059
For operation of the Computer Software Management and Information Center (COSMIC)
[NASA-CR-172904] N83-30060
GEOSCIENCE RESEARCH CORP., SALISBURY, MD.
East Antarctic ice sheet surface contours from satellite radar altimetry, a demonstration
[PB83-166397] N83-29796
GIESSEN UNIV. (WEST GERMANY).
Studies about alternative propellants for ion propulsion systems N83-29436
GLASGOW UNIV. (SCOTLAND).
Models for predicting tip clearance changes in gas turbines N83-29255
Axial compressor characteristics during transients N83-29259
GRONINGEN RIJKSUNIVERSITEIT (NETHERLANDS).
Quasi periodicity in local bifurcation theory
[PB83-165092] N83-30144
GRUMMAN AEROSPACE CORP., BETHPAGE, N.Y.
Potential benefits of a Full Authority Digital Electronic Control (FADEC) installed on a TF30 engine in an F14 flight test demonstrator aircraft N83-29269
Reduced-pollution corrosion-protection systems
[PB83-153056] N83-29378

H

HAMILTON STANDARD, WINDSOR LOCKS, CONN.
Small transport aircraft technology propeller study
[NASA-CR-186045] N83-29178
HARRY DIAMOND LABS., ADELPHI, MD.
Design-dependent variability of pulse hardness of types of discrete semiconductor devices (intervendor variations)
[AD-A125776] N83-29560
HARVARD UNIV., CAMBRIDGE, MASS.
Molecular beam chemistry: Reactions of oxygen atoms with halogen molecules
[AD-A125870] N83-30175
HELIOTRONIC G.M.B.H., BURGHAUSE (WEST GERMANY).
Silicon material development for terrestrial solar cells. Phase of exploration
[BMFT-FB-T-83-027] N83-29868
HELSINKI UNIV. OF TECHNOLOGY, ESPOO (FINLAND).
Influence of surface type on the brightness temperature of snow-covered terrain N83-29532
HERAEUS (W. C.) G.M.B.H., HANAU (WEST GERMANY).
Palladium electrolytes for use in selective plating processes
[BMFT-FB-T-83-024] N83-29376
HOCHSCHULE DER BUNDESWEHR, MUNICH. (WEST GERMANY).
Distortions in FM car radios caused by multipath reception and their reduction by means of antenna diversity N83-29502
HONEYWELL CORPORATE TECHNOLOGY CENTER, BLOOMINGDALE, MINN.
Metal coated optical fibers for sensors
[AD-A126088] N83-30224
HONEYWELL, INC., BLOOMINGTON, MINN.
Residential combustion heating system performance analysis study
[PB83-161406] N83-29481
Planar optical sources and detectors for monolithic integration with GaAs MESFET electronics
[DE82-010896] N83-29615
HONEYWELL SYSTEMS AND RESEARCH CENTER, MINNEAPOLIS, MINN.
Image processing and digitization facility
[AD-A126307] N83-30074
HOUSTON UNIV., CLEAR LAKE, TEX.
Assessing very long-range impacts from a rapid climate change
[DE82-017229] N83-29937
HOWARD UNIV., WASHINGTON, D. C.
Attitude dynamics and stability of large flexible structures in orbit N83-29729

I

IBM WATSON RESEARCH CENTER, YORKTOWN HEIGHTS, N.Y.
Spectroscopic studies of the electronic structure of metal-semiconductor and vacuum-semiconductor interfaces
[AD-A125621] N83-30272
IDAHO NATIONAL ENGINEERING LAB., IDAHO FALLS.
Summary and results of the comprehensive environmental monitoring program at the INEL's Raft River geothermal site
[DE83-005583] N83-29879
Dispersion in fracture networks
[DE83-005584] N83-29913
IFE UNIV., ILE-IFE (NIGERIA).
Statistics of radio refractivity and atmospheric attenuation in tropical climates N83-29505
Measurements and analysis of raindrop size distribution in south western Nigeria N83-29518
IFM AKUSTIBYRAN A.B., STOCKHOLM (SWEDEN).
Influence from coriolis and centripetal accelerations on in-service tire vibrations
[PB83-145185] N83-29469
IIT RESEARCH INST., CHICAGO, ILL.
Creep of plasma sprayed zirconia
[NASA-CR-167868] N83-29393
ILLINOIS UNIV., CHAMPAIGN.
The event related brain potential as an index of information processing, cognitive activity, and skill acquisition: A program of basic research
[AD-A125699] N83-29999
ILLINOIS UNIV., URBANA.
Coding for frequency-hopped spread-spectrum channels with partial-band interference
[AD-A125872] N83-29582
Multidimensional signal restoration and band-limited extrapolation, 2
[AD-A125877] N83-29583
On sequential detection in dependent noise
[AD-A125836] N83-29600
Large-scale circuit simulation
[AD-A125941] N83-29607
Camel gate field effect transistors
[AD-A125942] N83-29608
Effects of variation in load history on cyclic response of concrete flexural members
[PB83-153403] N83-29741
Chained aggregation and control system design: A geometric approach
[AD-A125853] N83-30098
Singular perturbations and time-scale methods in control theory: Survey 1976-1982
[AD-A125908] N83-30100
A critique and an appraisal of VLSI models of computation
[AD-A125835] N83-30117
Time scales, coherency, and weak coupling
[AD-A125845] N83-30118
Decomposition of time scales in linear systems and Markovian decision processes
[AD-A125852] N83-30119
Topics in robust statistical signal processing
[AD-A125931] N83-30126
Multirate linear multistep methods for the solution of systems of ordinary differential equations
[DE83-004259] N83-30135
An application of digital extrapolation in array processing
[AD-A125871] N83-30229
Experimental studies of lateral electron transport in gallium arsenide-aluminum gallium arsenide heterostructures
[AD-A125858] N83-30275
ILLINOIS UNIV., URBANA-CHAMPAIGN.
Seismic energy absorption in simple structures
[PB83-143917] N83-29464
INDIAN INST. OF TECH., NEW DELHI.
Proceedings of the IFAC Symposium on Theory and Application of Digital Control. Volume 1: Discussion papers
[PB83-163923] N83-29677
Proceedings of the IFAC Symposium on Theory and Application of Digital Control. Volume 2: Discussion papers
[PB83-163931] N83-29678
INDIANA STATE HOSPITAL, EVANSVILLE.
Feasibility of night-sky radiation with heat pumps
[DE83-006812] N83-29850
INDIANA UNIV., BLOOMINGTON.
Modification of a plasma-therm inductively coupled plasma supply to enable RF power modulation
[AD-A126232] N83-30237
INFOCOM, CRAWLEY (ENGLAND).
Foreign technology alert-bibliography: Ceramics, refractories and glass technology
[PB83-101642] N83-29323
Foreign technology alert-bibliography: Photography and recording devices. Citations from the NTIS data base
[PB83-101626] N83-29676
INFORMATICS, INC., PALO ALTO, CALIF.
Basic JCL for the CRAY-1 operating system (COS) with emphasis on making the transition from CDC 7600/SCOPE
[NASA-CR-166499] N83-30053
INFORMATION AND CONTROL SYSTEMS, INC., HAMPTON, VA.
Design, implementation and flight testing of PIF autopilots for general aviation aircraft
[NASA-CR-3709] N83-29270
INSTITUTE FOR ATMOSPHERE OPTICS AND REMOTE SENSING, HAMPTON, VA.
Multiple scattering effects in aerosols: Theoretical investigations
[AD-A125480] N83-29693
INSTITUTE FOR BASIC RESEARCH, CAMBRIDGE, MASS.
Hadronic Press monographs in theoretical physics, no. 2. Admissible approach to the hadronic structure. Volume 2: Covering of the Galilei and Einstein relavities?
[DE83-007251] N83-30160
INSTITUTE FOR PERCEPTION RVO-TNO, SOESTERBERG (NETHERLANDS).
Description of STIDAS 2-D. Part 1: General system and program description
[IZF-1982-29-PT-1] N83-29587
INSTITUTE OF APPLIED PHYSIOLOGY AND MEDICINE, SEATTLE, WASH.
Ultrasonic imaging development
[PB83-155994] N83-30007
INSTITUTE OF GAS TECHNOLOGY, CHICAGO, ILL.
Hydropyrolysis of biomass to produce liquid hydrocarbon fuels
[DE83-009985] N83-29420
Combined-cycle heat pump analysis program
[PB83-161042] N83-29483
INSTITUTE OF HYDROLOGY, WALLINGFORD (ENGLAND).
Derivation of catchment average unit hydrograph
[PB83-164574] N83-29797
MORECS (Metrological Office Rainfall and Evaporation Calculation Scheme) discussion meeting, April 1981
[PB83-163212] N83-29798
INSTITUTION OF ENGINEERS, NEW DELHI (INDIA).
Proceedings of the IFAC Symposium on Theory and Application of Digital Control. Volume 1: Discussion papers
[PB83-163923] N83-29677
Proceedings of the IFAC Symposium on Theory and Application of Digital Control. Volume 2: Discussion papers
[PB83-163931] N83-29678
INSTITUUT TNO VOOR WISKUNDE, INFORMATIEVERWERKING EN STATISTIEK, THE HAGUE (NETHERLANDS).
Non-linear regression
[PB83-167643] N83-30146
INTERMETRICS, INC., BETHESDA, MD.
Compiler features: A survey
[PB83-164418] N83-30046
INTERMETRICS, INC., HUNTSVILLE, ALA.
PDSS/IMC requirements and functional specifications
[NASA-CR-170801] N83-30055
INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION, OGDEN, UTAH.
Measurements of airtanker drop conditions during firefighting operations
[PB83-157883] N83-29203
INTERNATIONAL CENTRE FOR DIFFRACTION DATA, SWARTHMORE, PA.
Standard X-ray diffraction power patterns. Section 19: Data for 51 substances
[PB83-164962] N83-30292

INTERNATIONAL GEOPHYSICAL YEAR WORLD DATA CENTER A, BOULDER, COLO.
International Catalog of Geomagnetic Data
[PB83-161679] N83-29921
INTERNATIONAL GEOPHYSICAL YEAR WORLD DATA CENTER B, MOSCOW (USSR).
International Catalog of Geomagnetic Data
[PB83-161679] N83-29921
INTERNATIONAL HARVESTER CO., HINSDALE, ILL.
Methanol from landfill gas: Technology and economics
[PB83-169144] N83-29443
IOWA INST. OF HYDRAULIC RESEARCH, IOWA CITY.
Calculation of three-dimensional boundary layers on bodies at incidence
[AD-A125634] N83-29637
ISRAEL ATOMIC ENERGY COMMISSION, YAVNEH.
Laser-fusion (for pedestrians)
[PB83-166470] N83-30265
ITEK CORP., LEXINGTON, MASS.
Grating beam combiner
[AD-A125456] N83-29692

J

JANIS RESEARCH CO., INC., STONEHAM, MASS.
Technical manual for continuous flow LHe4 cryopump J.N. 2977
[AD-A125833] N83-29454
JAYCOR, ALEXANDRIA, VA.
Vacuum inductive store/pulse compression experiments on a high power accelerator using plasma opening switches
[AD-A126268] N83-30176
Modeling of imploded annular plasmas
[AD-A126179] N83-30238
JAYCOR, DEL MAR, CALIF.
A theoretical analysis of the observed calcium anomalies concomitant with the interaction of low intensity electric fields with cerebral tissue
[AD-A126284] N83-29996
JET PROPULSION LAB., CALIFORNIA INST. OF TECH., PASADENA.
Interactions Measurements Payload for Shuttle (IMPS)
[AD-A125841] N83-29299
Stereo side-looking radar experiments
[NASA-CR-172905] N83-29489
Carbon granule probe microphone for leak detection
[NASA-CASE-NPO-16027-1] N83-29595
SEASAT synthetic-aperture radar data user's manual
[E83-10321] N83-29746
Evaluation of LANDSAT-4 TM and MSS ground geometry performance without ground control
[E83-10338] N83-29749
Production of butanol by fermentation in the presence of co-culture of clostridium
[NASA-CASE-NPO-16203-1] N83-29806
FSA field test report, 1980 - 1982
[NASA-CR-172863] N83-29808
Applications of ethylene vinyl acetate as an encapsulation material for terrestrial photovoltaic modules
[NASA-CR-172862] N83-29809
Generic waste management requirements for a Controlled Ecological Life Support System (CELSS)
N83-30029
X-ray imaging mirror system and method of producing the same
[NASA-CASE-NPO-15828-1] N83-30222
Method for growing low defect, high purity crystalline layers
[NASA-CASE-NPO-15813-1] N83-30269
JOHNS HOPKINS UNIV., LAUREL, MD.
The development and testing of a stochastic variational principle for electromagnetic scattering N83-29535
JOINT PUBLICATIONS RESEARCH SERVICE, ARLINGTON, VA.
USSR report: Space, No. 22
[JPRS-83612] N83-29280
Post-flight interview with Berezevoy and Lebedev N83-29281
Optical orientation in space N83-29282
Robots on Venus N83-29283
Beregovoy on future construction in space N83-29284
Remote control of on-board satellite systems N83-29285
Dynamics of ocean and atmosphere on basis of observations from Salyut-6 N83-29286
Further development of Kospas-Salyut system N83-29287
USSR-India cooperative space programs N83-29288
Contribution of space program to national economy N83-29289
Legal delimitation of airspace N83-29290
USSR report: Life sciences. Effects of nonionizing electromagnetic radiation, no. 10
[JPRS-83745] N83-29973
Autoallergic effects of microwave electromagnetic energy and their influence on the fetus and offspring N83-29974
Effect of low-intensity superhigh-frequency energy on respiration and oxidative phosphorylation of organ mitochondria and activity of some blood enzymes N83-29975
Problems of studying the biological effect of electromagnetic fields discussed N83-29976
Effect of cordiamine and mesatone on ECG under conditions of acute microwave irradiation N83-29977
Local use of microwave electromagnetic energy on biologically active points N83-29978
Influence of prolonged illumination of the rabbit retina by monochromatic light on its functional state N83-29979
Dependence of biological effects of microwave irradiation on exposure intensity and duration N83-29980
Metabolism of the brain and liver after experimental exposure to super high-frequency fields of non-thermal intensity N83-29981
State of hepatic circulation in response to combined effect of lead and electromagnetic fields N83-29982
Morphological changes in neurons of the central nervous system in response to experimental influence of centimeter-range electromagnetic waves on the body N83-29983
Action of industrial frequency electric field on indicators of natural immunity N83-29984
Effect of industrial frequency electric field (50 Hz) on metabolism of copper, iron and metalloenzymes bound to them (experimental research) N83-29985
Use of magnets in medical treatment N83-29986
Genetic danger of non-thermal intensity microradio waves and its hygienic aspects N83-29987

K

KAMAN SCIENCES CORP., COLORADO SPRINGS, COLO.
Development and qualification of computer-aided assessment (CAS)
[AD-A125477] N83-30078
KANSAS STATE UNIV., MANHATTAN.
Diffusion-flame studies of the chemical and physical mechanisms of soot formation from aromatic and substituted-aromatic fuels
[DE83-009093] N83-29334
KANSAS UNIV., LAWRENCE.
Assessment of the geothermal resources of Kansas. Volume 2, section 2: Appendices
[DE83-003221] N83-29786
Solar and interplanetary ions near Earth N83-29891
Confidence envelopes for monotonic functions: Principles, derivations, and examples
[AD-A126230] N83-30151
KANSAS UNIV. CENTER FOR RESEARCH, INC., LAWRENCE.
Helicopter-borne scatterometer
[AD-A125796] N83-29561
KARLSRUHE UNIV. (WEST GERMANY).
Layout algorithms for the design of very large scale integrated circuits using partitioning
[BMFT-FB-T-83-018] N83-29620
Time-dependent convection
[BMFT-FB-W-83-001] N83-29648
KHARTOUM UNIV. (SUDAN).
Some X-band measurements of the dielectric constant of dust N83-29514
KHD LUFTFAHRTTECHNIK G.M.B.H., OBERURSEL (WEST GERMANY).
Experience with the KHD APU T312 for a modern fighter type N83-29251
KING RESEARCH, INC., ROCKVILLE, MD.
Integration of new technology in Army libraries
[AD-A125983] N83-30307
KOKUSAI DENSHIN DENWA CO. LTD., TOKYO (JAPAN).
Correlation of 6 and 4 GHz rain-induced depolarization at low elevation angle N83-29529
KRAFTWERK UNION A.G. REAKTORTECHNIK, ERLANGEN (WEST GERMANY).
Increasing the efficiency of coal-fired power plants by means of a transition to maximum steam conditions
[BMFT-FB-T-83-033] N83-29869

L

LASER TECHNOLOGY, INC., NORTH HOLLYWOOD, CALIF.
Cutting with diamond wire: Cutting procedures and suggested uses N83-29447
LEHIGH UNIV., BETHLEHEM, PA.
Pressure sintering and creep deformation: A joint modeling approach
[DE83-006516] N83-29738
LETTERMAN ARMY INST. OF RESEARCH, SAN FRANCISCO, CALIF.
Domestic swine in physiological research. Part 4: A blood acid-base curve nomogram for immature pigs
[AD-A126081] N83-29971
LEWIS (JOHN S.) ASSOCIATES, INC., TUCSON, ARIZ.
Planetary atmospheres program
[NASA-CR-172879] N83-30339
LIBRARY OF CONGRESS, WASHINGTON, D. C.
LC Science Tracer Bullet: Jet engines and jet aircraft
[TB-82-5] N83-29207
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
A note on beamforming algorithms
[AD-A126275] N83-29564
EHF dielectric lens antenna for Satellite Communication Systems
[AD-A126214] N83-29578
Multi-dimensional signal procesing research program
[AD-A126333] N83-29580
Steady state performance of survivable routing procedures for circuit-switched mixed-media networks
[AD-A126213] N83-29610
Restructurable VLSI program
[AD-A126216] N83-29611
Object detection by two-dimensional linear prediction
[AD-A126340] N83-30128
Modeling and analysis of teams of interacting decisionmakers with bounded rationality
[AD-A125582] N83-30298
LOCKHEED MISSILES AND SPACE CO., PALO ALTO, CALIF.
Coordinated ground-based measurements at Chatanika: Auroral spatial and temporal structures
[AD-A126113] N83-29900
LOCKHEED MISSILES AND SPACE CO., SUNNYVALE, CALIF.
ACOSS twelve (Active Control of Space Structures)
[AD-A126053] N83-29307
LOS ALAMOS SCIENTIFIC LAB., N. MEX.
Kinetics of the thermal decomposition of solid PETN
[DE82-004368] N83-29425
Three dimensional modeling of shock initiation of heterogeneous explosives
[DE82-006145] N83-29426
PRESS: A computer program for evaluating explosive-material loading processes
[DE82-015256] N83-29427
Active tuning of rf cavities
[DE83-007126] N83-29586
Los Alamos portable beta-ray spectrometer
[DE83-007575] N83-29667
Operating experience with a liquid-hydrogen fueled Buick and refueling system
[DE82-008113] N83-29716
Electrochemistry of fuel cells for transportation applications
[DE82-008115] N83-29819
Passive solar concepts for multistory buildings
[DE82-012139] N83-29826
Intrinsically irreversible heat engines
[DE82-015729] N83-29853
Vegetational analysis of a canyon ecosystem at Los Alamos
[DE83-008277] N83-29878
SENSIT-2D: A two-dimensional cross-section sensitivity-and uncertainty-analysis code
[DE83-004479] N83-30083
Finite-element approach to analyzing coupled thermal-hydraulic problems
[DE83-007565] N83-30139
Resonantly enhanced vacuum-ultraviolet generation and multiphoton ionization in carbon monoxide gas
[DE82-012147] N83-30183
Rare kaon decays at LAMPF 2
[DE82-019191] N83-30187
Application of adjusted data in calculating fission-product decay energies and spectra
[DE82-019182] N83-30193
Electronic isotope shifts muonic atoms and electron scattering
[DE82-014040] N83-30194
Generalized view factor techniques for treating streaming and scattering in neutral-particle transport
[DE82-014046] N83-30196

Recently developed methods in neutral-particle transport calculations: Overview
[DE82-014043] N83-30197
Optical pumping for intense polarized ion sources
[DE82-012136] N83-30231
Self-consistent electron transport in collisional plasmas
[DE82-014083] N83-30244
Methods for two-dimensional charged-particle transport in collisionless plasmas
[DE82-014044] N83-30245
Statistical magnetohydrodynamics and reversed-field-pinch quiescence
[DE82-015740] N83-30246
Hot-electron distribution function in high-Z materials
[DE82-008109] N83-30282
Devil's staircase and order without periodicity in classical condensed matter
[DE82-015744] N83-30283

LOUISIANA STATE UNIV., BATON ROUGE.
Monitoring biotransformation and biodegradation of xenobiotics in simulated aquatic microenvironmental systems
[PB83-153718] N83-29883

LOWELL UNIV., MASS.
Development of a process to produce alcohol at paper mills
[DE83-009668] N83-29422
Symmetric four antenna array resolves multiple reflectors with complex spectrum analysis of multiplexed closely spaced frequency soundings N83-29555
Automatic scaling of digisonde ionograms test and evaluation report
[AD-A125830] N83-30064
Processing of digital ionograms
[AD-A125831] N83-30065

M

MARTINI ENGINEERING, RICHLAND, WASH.
Stirling engine design manual, 2nd edition
[NASA-CR-158088] N83-30328

MARYLAND UNIV., COLLEGE PARK.
Understanding objects, features and backgrounds
[AD-A125514] N83-30013
International Workshop on High-level Language Computer Architecture
[AD-A126223] N83-30043
An introduction to the FEARS (Finite Element Adaptive Research Solver) program
[AD-A127737] N83-30081
On the characterization of simple closed surfaces in 3-dimensional digital images
[AD-A125573] N83-30116
Creation of high energy electron tails due to the modified 2-stream instability
[NASA-CR-172819] N83-30171
Selective non-resonant acceleration of 3He++ and heavy ions by H+ cyclotron waves
[NASA-CR-172820] N83-30182

MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
Gem-difluoroallyllithium: Preparation by lithium-halogen exchange and utilization in organosilicon and organic synthesis
[AD-A126094] N83-29328
Effect of the test environment on creep crack growth rates for nickel base alloys. A study of creep crack growth in 2219-T851 aluminum alloy using a computerized testing system
[AD-A125698] N83-29361
Organosilicon compounds and organosilicon polymer intermediates
[AD-A127752] N83-29403
Computer simulation and control of underwater vehicles
[PB83-150532] N83-29462
Exploration of new methods to produce efficient sources of coherent near millimeter wave radiation
[AD-A125772] N83-29559
Relativistic two-dimensional theory of RF current drive
[DE83-010250] N83-29613
Sensing systems for measuring mechanical properties in ground masses. Volume 3: Vane shear and cone piezometer
[PB83-155960] N83-29793
Evaluation of the ORNL residential energy-use model
[DE82-905768] N83-29820
Spectroscopic properties of metal monoxides and hydroxides important in the ionosphere
[AD-A126332] N83-29905
A low-order model of a moist general circulation: Formulation and testing
[AD-A126331] N83-29953
To produce nutrients for plant growth N83-30027
Food systems for PCELSS N83-30028
Comparison of linear and nonlinear random field estimators
[PB83-169755] N83-30145
Stellarator physics evaluation studies
[DE83-006359] N83-30240
Physical and engineering constraints for Tokamak reactors and helical coils
[DE82-019251] N83-30247
Grain-boudary-diffusion mechanisms in metals
[DE82-018814] N83-30280

MATHEMATISCH CENTRUM, AMSTERDAM (NETHERLANDS).
Linear programming and finite Markovian control problems
[MATH-CENTRE-TRACTS-148] N83-30050
An analysis of sparse matrix storage schemes
[MATH-CENTRE-TRACTS-150] N83-30103
Projections of lawless sequences
[MATH-CENTRE-TRACTS-152] N83-30104
Application of the theory of boundary value problems in the analysis of a queueing modeling with paired services
[MATH-CENTRE-TRACTS-153] N83-30105
Higher order asymptotics for simple linear rank statistics
[MATH-CENTRE-TRACTS-151] N83-30147

MAX-PLANCK-INSTITUT FUER AERONOMIE, KATLENBURG-LINDAU (WEST GERMANY).
Mesospheric water vapor measured with an airborne sensor N83-29531

MAX-PLANCK-INSTITUT FUER STROEMUNGSFORSCHUNG, GOETTINGEN (WEST GERMANY).
Studies on production results in the reaction of oxygen atoms with ethylene
[MPIS-18/1982] N83-30206

MAYO CLINIC, ROCHESTER, MINN.
Leadless chip carrier packaging and CAD/CAM (Computer-Aided Design/Computer-Aided Manufacturing) supported wire wrap interconnect technology for subnanosecond ECL (Emitter Coupled Logic)
[AD-A126156] N83-30277

MCDONNELL AIRCRAFT CO., ST. LOUIS, MO.
Subsonic panel method for designing wing surfaces from pressure distribution
[NASA-CR-3713] N83-29198
V/STOL fountain force coefficient
[AD-A126261] N83-29200
Variable acuity remote viewing system flight demonstration
[NASA-CR-170404] N83-29204

MCDONNELL-DOUGLAS ASTRONAUTICS CO., HUNTINGTON BEACH, CALIF.
Evolutionary space platform concept study. Volume 2, part 2: Manned space platform concepts
[NASA-CR-170829] N83-29306
Environmental degradation of solar optical materials. Volume 1: Literature survey
[DE83-010298] N83-29837

MCDONNELL-DOUGLAS RESEARCH LABS., ST. LOUIS, MO.
Advanced methods for preparation and characterization of infrared detector materials
[NASA-CR-170798] N83-30271

MERCK (E.), DARMSTADT (WEST GERMANY).
Nematic liquid crystals for display systems
[BMFT-FB-T-83-004] N83-30286

MERIX CORP., BABSON PARK, MASS.
Alcohol-Fuels Grant Program. Low-energy route for alcohol/gasohol recovery from fermentor beer
[DE83-009665] N83-29423

MESSERSCHMITT-BOELKOW-BLOHM G.M.B.H., MUNICH (WEST GERMANY).
A look at engine handling aspects from aircraft flight test experience; with an outlook for future requirements N83-29245

MEYER (W. E.), STATE COLLEGE, PA.
Synthesis of frictional requirements research
[PB83-156315] N83-29466

MICHIGAN STATE UNIV., EAST LANSING.
Influence of a large free stream disturbance level on dynamics of a jet in a cross flow N83-29217
Use of remote sensing for land use policy formulation
[E83-10326] N83-29747
Mechanical properties of the spinal ligaments of primates. Part 1: Cyclic loading. Part 2: Mathematical modeling
[AD-A125540] N83-29968

MICHIGAN TECHNOLOGICAL UNIV., HOUGHTON.
Propagation of visible and infrared radiation in fog, rain, and snow
[AD-A126062] N83-29899

MICHIGAN UNIV., ANN ARBOR.
Monte Carlo modeling in elliptic flows N83-29225
Process development for silicon carbide based structural ceramics
[AD-A125857] N83-29399
High-performance banded and profile equation solvers for the CRAY-1. Part 1: The unsymmetric case
[AD-A125561] N83-30115
High-performance banded equation solver for the CRAY-1. Part 2: The symmetric case
[AD-A125560] N83-30127

MIDLAND-ROSS CORP., TOLEDO, OHIO.
Industrial burner and process efficiency program
[PB83-161059] N83-29482

MIDWEST RESEARCH INST., GOLDEN, COLO.
Marine Biomass Program: Kelp biomass program summary
[PB83-167247] N83-29438
Analysis of the adsorption process and of desiccant cooling systems: A pseudo- steady-state model for coupled heat and mass transfer
[DE83-005752] N83-29828
Behavior of nine solar-pond candidate salts
[DE83-006029] N83-29830
Measured performance results: Low-cost solar water heating systems in the San Luis Valley
[DE83-006488] N83-29831
SERI Biomass Program
[DE83-009763] N83-29845
Heat and mass extraction from solar ponds: Analysis and development of a laboratory facility
[DE82-013888] N83-29856
Solar storage for process heat and building application: A review of prior assessments
[DE82-019791] N83-29857

MINISTRY OF POSTS AND TELECOMMUNICATIONS, TOKYO (JAPAN).
Experimental study of propagation characteristics in millimeter wave region N83-29517

MINNESOTA UNIV., MINNEAPOLIS.
Constant temperature and thermal gradient investigations of the near field subseabed environment: Chemical and thermodiffusional effects
[DE82-018589] N83-29958
DIDA: Dynamic Image Disparity Analysis
[AD-A126327] N83-30080

MINNESOTA UNIV., ST. PAUL.
Ground water quality in southeastern Minnesota
[PB83-154377] N83-29800

MISSION RESEARCH CORP., ALEXANDRIA, VA.
Microwave conditioned dc discharges for excitation of rare-gas-halide lasers
[AD-A126222] N83-29694

MISSISSIPPI STATE UNIV., STATE COLLEGE.
A gas jet impacting a cavity N83-29627

MISSOURI UNIV., COLUMBIA.
Non-self-adjoint inverse spectral theoretic derivation of a complex von Neumann-Wigner potential
[DE83-009064] N83-30137

MITRE CORP., MCLEAN, VA.
High-power generation of microwave and infrared radiation
[AD-A125953] N83-30161

MOLECULON RESEARCH CORP., CAMBRIDGE, MASS.
Low-energy process to extract anhydrous ethanol from fermentation beers
[DE83-005012] N83-29419

MOTOREN- UND TURBINEN-UNION MUENCHEN G.M.B.H. (WEST GERMANY).
Some general topics in the field of engine handling N83-29242
Turbine tip clearance control in gas turbine engines N83-29254

MOUND LAB., MIAMISBURG, OHIO.
Oxygen diffusion of anodic surface oxide film on titanium studied by Auger electron spectroscopy
[DE82-013653] N83-29340
Hydrogen attack of bainitic 2 1/4 Cr-1Mo steel
[DE82-019169] N83-29370
Electrothermal response testing: A component development tool
[DE82-012694] N83-29617
Feasibility of a free-standing insertable heat source
[DE82-014207] N83-29867

MUNICIPAL ENVIRONMENTAL RESEARCH LAB., CINCINNATI, OHIO.
Corrosion control: Why the laboratory needs to be involved
[PB83-152009] N83-29380
Adequacy of disinfection for control of newly recognized waterborne pathogens
[PB83-152181] N83-29884

N

NATIONAL ACADEMY OF SCIENCES - NATIONAL RESEARCH COUNCIL, WASHINGTON, D. C.
The free electron laser: A resource paper
[PB83-148931] N83-29704
Arctic terrestrial environmental research programs of the Office of Energy Research, Department of Energy: Evaluation and recommendations
[DE82-018600] N83-29871
Non-invasive method and apparatus for measuring pressure within a pliable vessel
[NASA-CASE-ARC-11264-2] N83-29991
Scientific communication and national security
[PB83-157800] N83-30320

NATIONAL AERONAUTICAL ESTABLISHMENT, OTTAWA (ONTARIO).
A survey of serious aircraft accidents involving fatigue fracture. Volume 1: Fixed-wing aircraft
[NAE-AN-7] N83-29187
A survey of serious aircraft accidents involving fatigue fracture. Volume 2: Rotary-wing aircraft
[NAE-AN-8] N83-29188

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
Proving the Space Transportation System: The orbital flight test program
[NASA-FACTS-137-83] N83-29298
Structure and growth process of vapor-grown carbon fibers
[NASA-TM-77046] N83-29313
Propagation effects handbook for satellite systems design. A summary of propagation impairments on 10 to 100 GHz satellite links with techniques for system design
[NASA-RP-1082(03)] N83-29491
Land-related global habitability science issues
[NASA-TM-85841] N83-29744
Accuracy, reproducibility and vertical resolution of data from radiosondes
[NASA-TM-76949] N83-29925
Aerospace medicine and biology: A continuing bibliography with indexes (supplement 247)
[NASA-SP-7011(247)] N83-29989
Publications of the exobiology program for 1982. A special bibliography
[NASA-TM-85837] N83-30041
Data highway terminal controller
[NASA-TM-77241] N83-30042
Photoionization research on atomic radiation. 3: The ionization cross section of atomic nitrogen
[NASA-TM-77107] N83-30172
Photoionization research on atomic beams. 2: The photoionization cross section of atomic oxygen
[NASA-TM-77106] N83-30173
Reconstruction of the H2O profile from the results of modeling the heat flux in the lower atmosphere of Venus
[NASA-TM-77216] N83-30343

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.
The evaluation of the rolling moments induced by wraparound fins
[NASA-TM-84381] N83-29180
Convergence characteristics of nonlinear vortex-lattice methods for configuration aerodynamics
[NASA-TM-84371] N83-29181
Development and evaluation of a Kalman-filter algorithm for terminal area navigation using sensors of moderate accuracy
[NASA-TP-2035] N83-29193
An experimental investigation of the subcritical and supercritical flow about a swept semispan wing
[NASA-TM-84367] N83-29634
Parabolized Navier-Stokes solutions of separation and trailing-edge flows
[NASA-TM-84378] N83-29635
Numerical simulation of vortex breakdown by the vortex-filament method
[NASA-TM-84334] N83-29636
Impact of LANDSAT MSS sensor differences on change detection analysis N83-29759
The 1980 stratospheric-tropospheric exchange experiment
[NASA-TM-84297] N83-29924
Non-invasive method and apparatus for measuring pressure within a pliable vessel
[NASA-CASE-ARC-11264-2] N83-29991
Controlled Ecological Life Support System. First Principal Investigators Meeting
[NASA-CP-2247] N83-30016
Current concepts of the CELSS program N83-30017
The CELSS program: An overview of its structure and use of computer modelling N83-30018
Control problems in autonomous life support systems N83-30020
Wet oxidation as a waste treatment method in closed systems N83-30030
Mineral separation in a CELSS by ion-exchange chromatography N83-30033
Pioneer Venus
[NASA-SP-461] N83-30340

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. EARTH RESOURCES LABS., BAY ST. LOUIS, MISS.
Literature review of organic matter transport from marshes
[E83-10352] N83-29750
Agricultural land cover mapping in the context of a geographically referenced digital information system
[E83-10357] N83-29768
Three-dimensional perspective software for representation of digital imagery data
[E83-10359] N83-29770
Utilization of LANDSAT multispectral data in geobotanical investigations: The location of ironstone gravel in the Sam Houston National Forest
[E83-10361] N83-29772
Computer implemented land cover classification using LANDSAT MSS digital data: A cooperative research project between the National Park Service and NASA. 3: Vegetation and other land cover analysis of Shenandoah National Park
[E83-10362] N83-29773

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.
Satellite orbit predictor
[NASA-TM-85015] N83-29293
The drag coefficient of cylindrical spacecraft in orbit at altitudes greater than 150 km
[NASA-TM-85043] N83-29294
Memory-based parallel data output controller
[NASA-CASE-GSC-12447-2] N83-29302
Cooling by conversion of para to ortho-hydrogen
[NASA-CASE-GSC-12770-1] N83-29324
High voltage isolation transformer
[NASA-CASE-GSC-12817-1] N83-29590
High voltage power supply
[NASA-CASE-GSC-12818-1] N83-29594
Geodetic distance measuring apparatus
[NASA-CASE-GSC-12609-2] N83-29681
SEASAT observations of lithospheric flexure seaward of trenches
[E83-10353] N83-29751
LANDSAT-4 Scientific Characterization: Early Results Symposium
[E83-10356] N83-29754
LANDSAT-4 hightlights N83-29755
LANDSAT-4 evaluation program and scientific characterization activities N83-29756
TM report N83-29757
Spectral characterization of the LANDSAT-4 thematic mapper sensors N83-29760
Thermal band characterization of LANDSAT-4 thematic mapper N83-29761
Reports on crustal movements and deformations
[NASA-TM-85041] N83-29894
On the joint bimodality of temperature and moisture near stratocumulus cloud tops
[NASA-TM-85008] N83-29927
GaAs Schottky barrier photo-responsive device and method of fabrication
[NASA-CASE-GSC-12816-1] N83-30268
Infrared radiation and inversion population of CO2 laser levels in Venusian and Martian atmospheres
[NASA-TM-85057] N83-30341
Modelling of the 10-micrometer natural laser emission from the mesospheres of Mars and Venus
[NASA-TM-85045] N83-30342
Infrared molecular emissions from comets
[NASA-TM-85067] N83-30344
Currents in Saturn's magnetosphere
[NASA-TM-85055] N83-30345
Structure and dynamics of Saturn's outer magnetosphere and boundary regions
[NASA-TM-85065] N83-30346
A study of the temporal and spectral characteristics of gamma ray bursts
[NASA-TM-85031] N83-30350
High Energy Astrophysics Laboratory Contributions to the 18th International Cosmic Ray Conference
[NASA-TM-85034] N83-30351

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LYNDON B. JOHNSON SPACE CENTER, HOUSTON, TEX.
Shuttle EVA description and design criteria
[NASA-TM-85355] N83-29297
A spillage detector for liquid chromatography systems
[NASA-CASE-MSC-20206-1] N83-29325
Degassifying and mixing apparatus for liquids
[NASA-CASE-MSC-18936-1] N83-29652
Portable 90 deg proof loading device
[NASA-CASE-MSC-20250-1] N83-29707

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LANGLEY RESEARCH CENTER, HAMPTON, VA.
Extended moment arm anti-spin device
[NASA-CASE-LAR-12979-1] N83-29173
Wind-tunnel investigation of aerodynamic loading on a 0.237-scale model of a remotely piloted research vehicle with a thick, high-aspect-ratio supercritical wing
[NASA-TM-84614] N83-29176
Finite area method for nonlinear supersonic conical flows
[NASA-CR-172148] N83-29177
Magnetic suspension and balance systems, a selected, annotated bibliography
[NASA-TM-84661] N83-29273
Pressure distributions obtained on a 0.04-scale and 0.02-scale model of the Space Shuttle Orbiter's forward fuselage in the Langley continuous flow hypersonic tunnel
[NASA-TM-84630] N83-29278
Interactive analysis of a large aperture Earth observations satellite
[NASA-TM-85638] N83-29304
Elastomer toughened polyimide adhesives
[NASA-LAR-12775-2] N83-29390
A solvent resistant, thermoplastic aromatic poly(imidesulfone) and process for preparing same
[NASA-CASE-LAR-12858-2] N83-29391
Curved cap corrugated sheet
[NASA-CASE-LAR-12884-1] N83-29446
CAD of control systems: Application of nonlinear programming to a linear quadratic formulation
[NASA-CR-172151] N83-29448
Induction heating gun
[NASA-CASE-LAR-13181-1] N83-29591
Predictions of entry heating for lower surface of shuttle orbiter
[NASA-TM-84624] N83-29631
Instrument for determining coincidence and elapse time between independent sources of random sequential events
[NASA-CASE-LAR-12531-1] N83-29651
Securable bearing stress-strain indicator
[NASA-CASE-LAR-12774-1] N83-29654
Dynamic-pressure measurements using an electronically scanned pressure module
[NASA-TM-84650] N83-29655
Daze fasteners
[NASA-CASE-LAR-13009-1] N83-29706
Ground test experience with large composite structures for commercial transports
[NASA-TM-84627] N83-29732
Advanced structures technology and aircraft safety
[NASA-TM-85664] N83-29733
Flow resistivity instrument
[NASA-CASE-LAR-13053-1] N83-29783
Production of butanol by fermentation in the presence of co-culture of clostridium
[NASA-CASE-NPO-16203-1] N83-29806
Algorithms and data structures for adaptive multigrid elliptic solvers
[NASA-CR-172158] N83-30056
N-person differential games. Part 2: The penalty method
[NASA-CR-166111] N83-30106
A preconditioned formulation of the Cauchy-Riemann equations
[NASA-CR-172156] N83-30107
Legendre-Tau approximations for functional differential equations
[NASA-CR-172155] N83-30108
Numerical solution of a coupled pair of elliptic equations from solid state electronics
[NASA-CR-172128] N83-30109
Finite-difference, spectral and Galerkin methods for time-dependent problems
[NASA-CR-172149] N83-30110
Preconditioned minimal residual methods for Chebyshev equations
[NASA-CR-172157] N83-30111
A compact finite difference scheme for div(Rho grad u) - q2u = 0
[NASA-CR-172165] N83-30112
The wedge hot-film anemometer in supersonic flow
[NASA-TP-2134] N83-30164
A finite difference solution for the propagation of sound in near sonic flows
[NASA-TM-84663] N83-30167
Scientific and technical information output of the Langley Research Center for calendar year 1982
[NASA-TM-84615] N83-30306

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LEWIS RESEARCH CENTER, CLEVELAND, OHIO.
Applications of the contravariant form of the Navier-Stokes equations
[NASA-TM-83448] N83-29179
Piezoelectric deicing device
[NASA-CASE-LEW-13773-1] N83-29197
Combustion Fundamentals Research
[NASA-CP-2268] N83-29208
Fuel spray diagnostics N83-29212
Fuel vaporization effects N83-29214
Dilution zone mixing N83-29216
Analytical calculation of a single jet in cross-flow and comparison with experiment N83-29219
Flame radiation measurements N83-29228
Multi-fuel rotary engine for general aviation aircraft
[NASA-TM-83429] N83-29235
The NASA broad-specification fuels combustion technology program: An assessment of phase 1 test results
[NASA-TM-83447] N83-29236
Parametric study of flame radiation characteristics of a tubular-can combustor
[NASA-TM-83436] N83-29237
Role of simulation and emulation in the development of Shuttle-Centaur (STS-Centaur)
[NASA-TM-83326] N83-29292
The adsorption and thermal decomposition of tricresylphosphate (TCP) on iron and gold
[NASA-TM-83341] N83-29311
An electrochemical rebalance cell for Redox systems
[NASA-TM-83363] N83-29326
Reactions of NaCl with gaseous SO3, SO2, and O2
[NASA-TM-83423] N83-29358
Considerations of technology transfer barriers in the modification of strategic superalloys for aircraft turbine engines
[NASA-TM-83395] N83-29360
Method of forming oxide coatings
[NASA-CASE-LEW-13132-1] N83-29388
Low temperature cross linking polyimides
[NASA-CASE-LEW-12876-2] N83-29392
Capabilities, limitations, and use of BC SAT-R2 conference software
[NASA-TM-83383] N83-29493
Design of a high-speed digital processing element for parallel simulation
[NASA-TM-83373] N83-29597
Magnetic heat pumping
[NASA-CASE-LEW-12508-3] N83-29625
Vibration in planetary gear systems with unequal planet stiffnesses
[NASA-TM-83428] N83-29709
Theoretical results for starved elliptical contacts
[NASA-TM-81697] N83-29710
Experimental investigations of elastohydrodynamic lubrication
[NASA-TM-81698] N83-29711
Elastohydrodynamics of elliptical contacts for materials of low elastic modulus
[NASA-TM-81699] N83-29712
Applications of film thickness equations
[NASA-TM-81701] N83-29713
High thermal power density heat transfer apparatus providing electrical isolation at high temperature using heat pipes
[NASA-CASE-LEW-12950-2] N83-29804
Polyvinyl alcohol battery separator containing inert filler
[NASA-CASE-LEW-13556-2] N83-29805
NASA Redox Project status summary
[NASA-TM-83401] N83-29810
Comparison of road load simulator test results with track tests on electric vehicle propulsion system
[NASA-TM-83393] N83-29811
Results of free yaw tests of the Mod-O 100 kilowatt wind turbine
[NASA-TM-83432] N83-29813
Flux-based acceleration of the Euler equations
[NASA-TM-83453] N83-30113
Turbulence spectra in the noise source regions of the flow around complex surfaces
[NASA-TM-83392] N83-30168

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.
Satellite retrieval system
[NASA-CASE-MFS-25403-1] N83-29303
Microfissuring of Inconel 718
[NASA-TM-82531] N83-29356
Electrical self-aligning connector
[NASA-CASE-MFS-25211-2] N83-29592
Three phase power factor controller
[NASA-CASE-MFS-25535-2] N83-29593
Method and apparatus for supercooling and solidifying substances
[NASA-CASE-MFS-25242-1] N83-29650
Dual laser optical system and method for studying fluid flow
[NASA-CASE-MFS-25315-1] N83-29680
Atmospheric observations for STS-4 landing
[NASA-TM-82495] N83-29923
Atmospheric environment for Space Shuttle (STS-6) launch
[NASA-TM-82529] N83-29926
Cape Canaveral, Florida range reference atmosphere 0-70 km altitude
[NASA-TM-85253] N83-29935
Proceedings of the 1st Space Plasma Computer Analysis Network (SCAN) Workshop
[NASA-TM-82514] N83-30095

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. PASADENA OFFICE, CALIF.
Carbon granule probe microphone for leak detection
[NASA-CASE-NPO-16027-1] N83-29595
Centrifugal-reciprocating compressor
[NASA-CASE-NPO-14597-2] N83-29708
X-ray imaging mirror system and method of producing the same
[NASA-CASE-NPO-15828-1] N83-30222
Method for growing low defect, high purity crystalline layers
[NASA-CASE-NPO-15813-1] N83-30269

NATIONAL AEROSPACE LAB., AMSTERDAM (NETHERLANDS).
Deterioration in service of engine transient behaviour N83-29256

NATIONAL BUREAU OF STANDARDS, BOULDER, COLO.
Membrane separations in chemical processing
[PB83-165068] N83-29355
EMI from solar panels and inverters
[DE83-006028] N83-29833

NATIONAL BUREAU OF STANDARDS, WASHINGTON, D.C.
Recycling municipal ferrous scrap
[PB83-156968] N83-29384
Proceedings of the 6th Annual Conference on Fire Research
[PB83-155887] N83-29463
Model of the steady-state performance of an absorption heat pump
[PB83-152314] N83-29471
Thermal behavior of fine-grained soils. Building science series
[PB83-164400] N83-29472
Report of the 67th National Conference on Weights and Measures 1982
[PB83-167148] N83-29473
Testing to quantify the effects of handling of gas dielectric standard capacitors
[PB83-149385] N83-29624
Semiconductor measurement technology: Graphical solution for the helium leak detector and radioisotope methods of hermetic test, master graphs and instructions
[PB83-146845] N83-29672
Development of the cone calorimeter, a bench scale heat release rate apparatus based on oxygen consumption
[PB83-151266] N83-29673
Semiconductor technology program progress briefs
[PB83-165043] N83-29675
NBS portable ambient particulate sampler
[PB83-165019] N83-29679
Beam-profile measurement of laser pulses using a spatial filter to sample the hermite modes for a string of pulses
[PB83-156612] N83-29702
A system for measuring energy and peak power of low-level 1.064 micrometer laser pulses
[PB83-165027] N83-29703
Beam-profile measurement of laser pulses using a spatial filter to sample the hermite modes for a string of pulses
[PB83-164996] N83-29705
Innovation for maintenance technology improvements
[PB83-149450] N83-29728
Federal Automated Data Processing (ADP) equipment: A compilation of statistics, 1981
[PB83-164384] N83-30045
Functional specifications for a federal information processing standard data dictionary system
[PB83-169441] N83-30049
Initial Graphics Exchange Specification (IGES), version 2.0
[PB83-137448] N83-30092
Quality of inspections utilizing infrared technology on weatherization retrofit installations
[PB83-146936] N83-30234
Journal of Research of the National Bureau of Standards, volume 87, number 5, September - October 1982
[PB83-164541] N83-30305

NATIONAL DEFENCE HEADQUARTERS, OTTAWA (ONTARIO).
Throttle handling related to J85 engine performance and durability: Canadian forces experience N83-29249

NATIONAL GAS TURBINE ESTABLISHMENT, PYESTOCK (ENGLAND).
Improvements in the dynamic simulation of gas turbines N83-29264
A new approach to reheat control N83-29268

NATIONAL GEODETIC SURVEY, ROCKVILLE, MD.
Automatic detection of loops in leveling networks
[PB83-154641] N83-29801

NATIONAL GEOPHYSICAL AND SOLAR-TERRESTRIAL DATA CENTER, BOULDER, COLO.
Solar-geophysical data prompt reports. Part 1: Data for October 1982, September 1982 and late data. Explanation of data reports issued as number 450 (Supplement) February 1982
[PB83-162057] N83-30331
Solar-geophysical data comprehensive reports. Part 2: Data for May 1982, June 1980 and miscellanea. Explanation of data reports issued as Number 450 (supplement) February 1982
[PB83-162065] N83-30332

NATIONAL INST. FOR TELECOMMUNICATIONS RESEARCH, JOHANNESBURG (SOUTH AFRICA).
LANDSAT imagery: Description of products available from the CSIR Satellite Remote Sensing Centre
[E83-10354] N83-29752

NATIONAL LAB. FOR HIGH ENERGY PHYSICS, IBARAKI-KEN (JAPAN).
Tests of a resonance detector spectrometer for electron-volt spectroscopy
[DE83-007611] N83-29666

NATIONAL LIBRARY OF MEDICINE, BETHESDA, MD.
Notes for medical catalogers, 1982
[PB83-170860] N83-30317

NATIONAL MATERIALS ADVISORY BOARD, WASHINGTON, D. C.
Titanium: Past, present, and future
[PB83-171132] N83-29386
Ferrous metal fires
[PB82-263161] N83-29387

NATIONAL OCEAN SURVEY, ROCKVILLE, MD.
US Coast Pilot 1. Atlantic Coast: Eastport to Cape Cod (19th Edition)
[PB83-157537] N83-29959

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, BOULDER, COLO.
Capability of surface-based clear-air Doppler radar for monitoring meteorological properties in elevated layers N83-29549
Geophysical monitoring for climatic change
[PB83-159905] N83-29948
Versatile three-dimensional Hamiltonian ray-tracing computer program for acoustic waves in the atmosphere
[PB83-149930] N83-30170

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, ROCKVILLE, MD.
National severe local storms operations plan
[PB83-163998] N83-29940
Automated Weather Information Systems (AWIS): Considerations for intra- and intersystem operations and interagency considerations in development and coordination of AWIS
[PB83-159848] N83-29949
Airborne laser hydrography, FY 1983. Issue paper
[PB83-158451] N83-29964

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, SEATTLE, WASH.
Vertical sections of temperature, salinity, thermosteric anomaly, and zonal geostrophic velocity from Norpax shuttle experiment, part 3
[PB83-169961] N83-29960
Feasibility study of mitigating tsunami hazards in the Pacific
[PB83-156885] N83-29966

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, WASHINGTON, D. C.
Satellite observation of Great Lakes ice: 1980-81
[PB83-156877] N83-29795
Proceedings of the WEFAX Users' Conference for National and International Users of GOES WEFAX Services
[PB83-161117] N83-29947
Satellite infrared observations of oceanic long waves in the Eastern Equatorial Pacific 1975 to 1981
[PB83-161133] N83-29963

NATIONAL PARK SERVICE, ATLANTA, GA.
Reference marker: Photopoint resources management system
[PB83-163345] N83-29467

NATIONAL PHYSICAL LAB., TEDDINGTON (ENGLAND).
Numerical solution of equations describing electromagnetic propagation in dielectric tube waveguides
[NPL-DITC-16/83] N83-29487
Biomechanics of head tolerance criteria
[NPL-DMA(A)64] N83-29990
An engineering assessment of head tolerance criteria
[NPL-DMA(A)63] N83-30015

NATIONAL RESEARCH COUNCIL OF CANADA, OTTAWA (ONTARIO).
Attenuation of radio waves by atmospheric wet ice and mixed phased hydrometeors N83-29553

NATIONAL SCIENCE FOUNDATION, WASHINGTON, D.C.
A Workshop on Alternative Fusion Concepts and Their Utilization Projections
[PB83-157966] N83-30263
Studies of scientific disciplines: An annotated bibliography
[PB83-159954] N83-30319

NATIONAL SEVERE STORMS FORECAST CENTER, KANSAS CITY, MO.
The operational meteorology of convective weather. Volume 1: Operational mesoanalysis
[PB83-162321] N83-29941

NATIONAL SEVERE STORMS LAB., NORMAN, OKLA.
Automatic recognition of mesocyclones from single Doppler radar data
[AD-A125854] N83-29929

NATIONAL SWEDISH INST. FOR BUILDING RESEARCH, STOCKHOLM.
Warm air systems. Part 1: Temperatures and temperature efficiencies
[PB83-148908] N83-29484
Warm air systems. Part 2: Tracer gas measurements and ventilation efficiencies
[PB83-148916] N83-29485

NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION, BOULDER, COLO.
Experimental and analytical aspects of atmospheric EHF refractivity N83-29556

NATIONAL TRANSPORTATION SAFETY BOARD, WASHINGTON, D. C.
Large airplane operations on contaminated runways
[PB83-917003] N83-29189

NATIONAL WEATHER SERVICE, GARDEN CITY, N.Y.
Automated hourly weather collective from HRR data input
[PB83-167122] N83-29943
Real-time quality control of SAOs
[PB83-166082] N83-29944

NATIONAL WEATHER SERVICE, SILVER SPRING, MD.
Mean monthly, seasonal and annual pan evaporation for the United States
[PB83-161729] N83-29942

NAVAL ACADEMY, ANNAPOLIS, MD.
An experimental study of a high rotational speed propulsor
[AD-A126060] N83-29238

NAVAL AIR DEVELOPMENT CENTER, WARMINSTER, PA.
Removal of hydrogen from plated high strength steel by baking: A statistically designed study
[AD-A126100] N83-29366
Fuel fire tests of selected assemblies
[AD-A125820] N83-29450
Solid-state lasers for bathymetry and communications. Studies of four rare-earth materials
[AD-A126098] N83-29683

NAVAL AIR PROPULSION TEST CENTER, TRENTON, N.J.
Rotor fragment protection program: Statistics on aircraft gas turbine engine rotor failures that occurred in US commercial aviation during 1979
[NASA-CR-168163] N83-29234

NAVAL AIR TEST CENTER, PATUXENT RIVER, MD.
The 5th Advanced Aircrew Display Symposium Proceedings
[AD-A126132] N83-29206

NAVAL CIVIL ENGINEERING LAB., PORT HUENEME, CALIF.
Experimental polyurethane foam roof systems, part 2
[AD-A126315] N83-29453

NAVAL ENVIRONMENTAL PREDICTION RESEARCH FACILITY, MONTEREY, CALIF.
Evaluation of the tropical cyclone spiral linearization technique
[AD-A126007] N83-29934

NAVAL HEALTH RESEARCH CENTER, SAN DIEGO, CALIF.
The Navy Mental Health Information System (NAMHIS): An overview
[AD-A126087] N83-30309

NAVAL MATERIAL COMMAND, WASHINGTON, D. C.
Tactical missile technologies: The European perspective
[AD-A126277] N83-29295

NAVAL OCEAN RESEARCH AND DEVELOPMENT ACTIVITY, BAY ST. LOUIS, MISS.
Water penetration photogrammetry. Volume 1: Feasibility and evaluation study
[AD-A126209] N83-29291
On the stress-shear relation near a turbulent air-sea interface
[AD-A126252] N83-29952
A plan for optical oceanography R&D to support MC&G
[AD-A126215] N83-29955

NAVAL OCEAN SYSTEMS CENTER, SAN DIEGO, CALIF.
Voice control of an unmanned submersible
[AD-A125523] N83-30039

NAVAL POSTGRADUATE SCHOOL, MONTEREY, CALIF.
The effects of grain size on the martensitic transformation in copper-zinc-aluminum shape memory alloys
[AD-A126056] N83-29363
Formulation of a prototype coupled atmospheric and oceanic boundary layer model
[AD-A126000] N83-29951
A distributed network supporting ocean surveillance
[AD-A125559] N83-29954
Non-parametric statistical software for the TRS-80 microcomputer
[AD-A126055] N83-30073
An enhanced conversion scheme for lexicographic, multiobjective integer programs
[AD-A125527] N83-30077
The structure of divide and conquer algorithms
[AD-A126086] N83-30124
A field visibility comparison between electroluminescent sources and standard US Coast Guard incandescent aids-to-navigation sources
[AD-A125575] N83-30223
The Naval Data Automation Command: A case study
[AD-A126290] N83-30300

NAVAL RESEARCH LAB., WASHINGTON, D. C.
Numerical simulation for droplet combustion using Lagrangian hydrodynamics N83-29210
Computation of propagation speed and reflection of axially symmetric waves in composite cylinders with application to impedance tube and calibrator
[AD-A125875] N83-29320
Electroactive polymers as antistatic materials
[AD-A126102] N83-29400
Voice-communication testing using naive and experienced communicators
[AD-A126109] N83-29568
Start-up of a pulsed beam Free Electron Laser (FEL) oscillator
[AD-A126306] N83-29684
Load ratio and environmental effects on fatigue crack growth rates for several ship steels
[AD-A126285] N83-29735
Restrained least-squares program (RESLSQ) users manual
[AD-A126171] N83-30082
Tables of spherical Bessel functions of the first and second kinds for complex arguments
[AD-A125876] N83-30130
Vacuum inductive store/pulse compression experiments on a high power accelerator using plasma opening switches
[AD-A126268] N83-30176
Ionizing potential waves in preionized gases
[AD-A126286] N83-30179

NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER, BETHESDA, MD.
The drag of a circular cylinder on or near a flat plat appropriate for ship-model turbulence stimulators
[AD-A126155] N83-29638

NAVAL SUBMARINE MEDICAL RESEARCH LAB., GROTON, CONN.
CO2 retention and ECG changes in exercise during prolonged hyperbaric N2-O2 breathing
[AD-A125403] N83-30002
Workshop on Detection and Measurement of Pulmonary Oxygen Toxicity
[AD-A125821] N83-30003

NAVAL SURFACE WEAPONS CENTER, WHITE OAK, MD.
Theory of gyrotron amplifier in a tape helix loaded waveguide
[AD-A126114] N83-29603
Theory of gyrotron amplifiers in a disk or a helix loaded waveguide
[AD-A126115] N83-29604
Theory of cusptron microwave tubes
[AD-A126116] N83-29605
Selection and calibration of pressure transducers for low pressure measurement (0.001 psia) in the tunnel 9 high altitude side force test (WTR 1365)
[AD-A125475] N83-29657
The axisymmetric instability of a self-pinched beam with a rounded radial density profile
[AD-A126117] N83-30178

NAVAL UNDERWATER SYSTEMS CENTER, NEW LONDON, CONN.
ELF PVS field strength measurements, April 1977
[AD-A126212] N83-29574
ELF (Extremely Low Frequency) PVS (Propagation Validation System) field strength measurements, January and February, 1978
[AD-A126208] N83-29577

NAVAL WEAPONS CENTER, CHINA LAKE, CALIF.
The hydrolysis of phosphate esters on solids
[AD-A126119] N83-29329
Reactively steered adaptive array using microstrip patch elements at 4 gigahertz
[AD-A126298] N83-29570

NAVTROL CO., DALLAS, TEX.
Antenna digital control for the Directed Mirror Antenna Radar (DMAR)
[AD-A125812] N83-29585

NEBRASKA UNIV., LINCOLN.
Biochemical and physiological characterization of higher plants with reduced photorespiration
[DE83-007949] N83-29972

NEILSEN ENGINEERING AND RESEARCH, INC., MOUNTAIN VIEW, CALIF.
A numerical study of Strake aerodynamics
[AD-A125882] N83-29182

NETHERLANDS ORGANIZATION FOR APPLIED SCIENTIFIC RESEARCH TNO, DELFT.
Application of thermistors to measure air flow velocities very close to surfaces
[TNO-81-016265] N83-29653
Preliminary investigation of the characteristics of an oscillating windpowered generator
[TNO-82-0344] N83-29803

NEW HAMPSHIRE UNIV., DURHAM.
Spatial and temporal visual masking and visibility
[AD-A125696] N83-30000

NEW MEXICO STATE UNIV., LAS CRUCES.
Establishment and furnishing of the Photovoltaic Center for the Southwest Residential Experiment Station
[DE82-904018] N83-29825

NEW MEXICO UNIV., ALBUQUERQUE.
Investigations of vacuum ultraviolet and soft X-ray lasers
[AD-A125558] N83-29690

NORTH AMERICAN WEATHER CONSULTANTS, INC., SALT LAKE CITY, UTAH.
Continuing design work for the Sierra Cooperative Pilot Project
[PB83-164236] N83-29945

NORTH CAROLINA BIOTECHNOLOGY CENTER, RESEARCH TRIANGLE PARK.
Biotechnology: The forging of multidisciplinary strategies for research in biomolecular electronics, materials sciences and microecology
[AD-A125799] N83-29967

NORTH CAROLINA STATE UNIV., RALEIGH.
Plant growth in controlled environments in response to characteristics of nutrient solutions N83-30026

NORTH CAROLINA UNIV., CHAPEL HILL.
Chemical modification of carbon electrodes
[AD-A125964] N83-29327

NORTH RESEARCH, INC., ANCHORAGE, ALASKA.
The bush pilot syndrome: A critical incident analysis N83-30008

NORTHROP CORP., HAWTHORNE, CALIF.
Performance of a quantitative study of instability-related delamination growth
[NASA-CR-166046] N83-29314

NORTHWESTERN UNIV., EVANSTON, ILL.
Lean limit phenomena N83-29229
Changes in residual stress, domain size and microstrain during fatigue of 1008 steel
[AD-A126058] N83-29364
Local defect arrays and properties of oxides
[AD-A125927] N83-29368

NORWEGIAN HYDRODYNAMIC LABS., TRONDHEIM.
Gas/liquid separation in transient flow preproject
[PB83-171041] N83-29352

O

OAK RIDGE NATIONAL LAB., TENN.
Analysis of refractory fiber insulations and hot face coatings exposed to coal-oil mixture combustion products
[DE82-018210] N83-29321
International survey of the status of technology of critical components for coal-liquefaction processes
[DE82-015236] N83-29339
Rapid-screening-luminescence techniques for trace organic analysis
[DE82-017518] N83-29341
Mechanical reliability of current alumina and beryllia ceramics used in microwave windows for gyrotrons
[DE83-006360] N83-29404
Basic studies of gases for fast switches
[AD-A126343] N83-29618
Applications of energy-release-rate techniques to part-through cracks in plates and cylinders, volume 2. ORVIRT: A finite element program for energy release rate calculations for 2-dimensional and 3-dimensional crack models
[DE83-007081] N83-29739
Fixed-base flywheel storage systems for electric-utility applications: An assessment of economic viability and R and D priorities
[DE83-007171] N83-29827
Toxicology Information Response Center: A ten-year perspective
[DE82-017430] N83-30005
The computer data-acquisition and control system for Thomson-scattering measurements
[DE83-008167] N83-30097
Multiphoton ionization and third-harmonic generation in atoms and molecules
[DE82-015748] N83-30185
Folding models for elastic and inelastic scattering
[DE82-013458] N83-30189
Relations between the simultaneous and sequential transfer of 2 nucleons
[DE82-017425] N83-30190
Gamma decay of unbound states following neutron capture
[DE82-017305] N83-30191
Nuclear-spectroscopy problems studied with neutrons
[DE82-017303] N83-30192
Probing the nuclear structure with heavy-ion reactions
[DE82-017316] N83-30195
Electron-impact ionization: Time-dependent and other numerical approaches
[DE82-017517] N83-30198
Stellarator physics evaluation studies
[DE83-006359] N83-30240
Neutral beam heating in stellarators: A numerical approach
[DE83-010458] N83-30242

OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AERONAUTIQUES, PARIS (FRANCE).
Test facility for basic research on distortion N83-29258

OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES, TOULOUSE (FRANCE).
The modern concept of acceleration control: Introduction to optimal command in a handling by objective structure N83-29267

OFFICE OF NAVAL RESEARCH, LONDON (ENGLAND).
European Scientific Notes, Volume 36, Number 12
[AD-A126057] N83-30353

OFFICE OF SOFTWARE DEVELOPMENT, FALLS CHURCH, VA.
FCSC (Federal Conversion Support Center) conversion tools survey
[PB83-172635] N83-30047

OFFICE OF TECHNOLOGY ASSESSMENT, WASHINGTON, D.C.
Increased automobile fuel efficiency and synthetic fuels. Alternatives for reducing oil imports. Background paper 5: Water availability for synthetic fuels: An assessment of current studies
[PB83-152645] N83-29437
Increased automobile fuel efficiency and synthetic fuels. Alternatives for reducing oil imports. Background paper number 3: Environmental issues of synthetic transportation fuels from coal
[PB83-161851] N83-29439
Increased automobile fuel efficiency and synthetic fuels: Alternatives for reducing oil imports. Background Paper Number 4: Environmental issues of synthetic transportation fuels from coal
[PB83-161919] N83-29440
Informational technology and its impact on American education
[PB83-174664] N83-30296
Space science research in the US: A technical memorandum
[PB83-166512] N83-30303
MEDLARS and health information policy
[PB83-168658] N83-30318

OHIO STATE UNIV., COLUMBUS.
Angle of arrival estimation
[AD-A126038] N83-29571
Jam resistant communications systems techniques
[AD-A126217] N83-29579
Scatter of elastic waves by a thin flat elliptical inhomogeneity
[NASA-CR-3705] N83-29725
Finite-element modeling of thermo-mechanical responses associated with underground coal conversion
[DE83-006748] N83-29848
Theories of nutation and polar motion III
[AD-A126289] N83-29902
On the permanence property in spherical spline interpolation
[AD-A126263] N83-30121

OHIO UNIV., ATHENS.
Stability improvements in geotomographic inversion methods N83-29540

OKLAHOMA STATE DEPT. OF HEALTH, OKLAHOMA CITY.
Advanced biological treatment of municipal wastewater through aquaculture
[PB83-159319] N83-29882

OKLAHOMA STATE UNIV., STILLWATER.
Turbulent combustor flowfield investigation N83-29220
Spectroscopic investigations of materials for tunable infrared lasers
[AD-A125538] N83-29689

OKLAHOMA UNIV., NORMAN.
Development of improved capabilities for computation of gas supercompressibility factors and other properties
[PB83-173369] N83-29444

OLD DOMINION SYSTEMS, INC., GAITHERSBURG, MD.
Distributed information delivery system. Design manual, version 1.0
[PB83-148809] N83-30321
Distributed information delivery system module descriptions, version 1.0
[PB83-156703] N83-30322

OPERATIONS RESEARCH, INC., SILVER SPRING, MD.
Propagation effects handbook for satellite systems design. A summary of propagation impairments on 10 to 100 GHz satellite links with techniques for system design
[NASA-RP-1082(03)] N83-29491
Emergency Medical Service (EMS): Rotorcraft Technology Workshop
[NASA-CR-166495] N83-30325

OREGON GRADUATE CENTER FOR STUDY AND RESEARCH, BEAVERTON.
Effect of microstructure and internal hydrogen on fatigue crack propagation of ultrahigh strength steels N83-29357

OULU UNIV. (FINLAND).
On language families generated by commutative languages
[ISSN-0355-0087] N83-30051

OXFORD UNIV. (ENGLAND).
Case-studies in direct digital control of stochastic systems
[OUEL-1430/82] N83-30102
Introduction to the possible substructure of quarks and leptons
[PB83-165605] N83-30211

P

PACIFIC NORTHWEST LAB., RICHLAND, WASH.
Identification and comparative genotoxicity of polycyclic aromatic hydrocarbons and related nitrogen-containing heteroatomic species in products from coal liquefaction processes
[DE83-006939] N83-29312
Progress in studies on catalyzed gasification of wood
[DE83-009124] N83-29332
Formation of aromatic and possible oligomeric materials from cellulose liquefaction
[DE83-005558] N83-29432
Dual tracer measurements of plume depletion
[DE83-005551] N83-29873
Radiation standards and calibrations
[DE82-019748] N83-30200

PACIFIC SOUTHWEST FOREST AND RANGE EXPERIMENT STATION, BERKELEY, CALIF.
Forestry information systems and terminology
[PB83-156158] N83-30315

PENNSYLVANIA STATE UNIV., UNIVERSITY PARK.
Structure of evaporating and combusting sprays: Measurements and predictions N83-29211
Importance of active sites for char gasification in oxygen (air) and carbon dioxide
[PB83-173393] N83-29445
Soil temperature investigations using satellite acquired thermal-infrared data in semi-arid regions
[E83-10355] N83-29753
The measurement of motivational style: A format modification
[AD-A125756] N83-30014

PHOENIX CORP., MCLEAN, VA.
Fiber optic magnetic sensor research
[AD-A126325] N83-30228

PITTSBURGH UNIV., PA.
Some prospects for antiproton physics
[DE82-011582] N83-30199

PLANNING SYSTEMS, INC. SLIDELL, LA.
Advanced type placement and geonames databases: Comprehensive coordination plan
[AD-A126241] N83-30299

PLANOLOGISCH STUDIECENTRUM TNO, DELFT (NETHERLANDS).
Meaning and construction of a geographic base file for a spatially oriented information system
[PB83-166108] N83-29961
Data source and information carrier as a base for a spatial-orientated information system
[PB83-166090] N83-29962

POLITECNICO DI MILANO (ITALY).
Site diversity in Earth to satellite links: Radar measurements and theoretical predictions N83-29552
Assessment of the intrinsic rain profile parameters from radar and raingauge data N83-29554

PORTSMOUTH POLYTECHNIC (ENGLAND).
An offsetting technique to study oscillations in direction of arrival in Earth-space paths N83-29509

PRATT AND WHITNEY AIRCRAFT, WEST PALM BEACH, FLA.
Designing for fighter engine transients N83-29243
Designing for stability in advanced turbine engines N83-29266

PRINCETON UNIV., N. J.
Coupling of transport and chemical processes in catalytic combustion N83-29230
Studies of dry-powder extinguishment of diffusion flames for condensed fuels
[PB83-150656] N83-29348
Thoughts on the evolution of dynamic graphics
[DE83-006146] N83-30084

PRINS MAURITS LAB. TNO, RIJSWIJK (NETHERLANDS).
Porous polymers as adsorbent for mustard gas
[PML-1981-46] N83-29389

PROJEKTGRUPPE INFORMATIONSSYSTEME G.M.B.H., BERLIN (WEST GERMANY).
Classification systems in information and documentation. Possibilities of further development
[BMFT-FB-ID-83-003] N83-30314

PUBLIC TECHNOLOGY, INC., WASHINGTON, D. C.
Local governments LANDSAT applications program
[E83-10364] N83-29775

PUERTO RICO UNIV., RIO PIEDRAS.
A microscopic model for the liquid metal: Ionic solution interface
[AD-A125531] N83-29367

PURDUE UNIV., LAFAYETTE, IND.
Spontaneous ignition characteristics of hydrocarbon fuel-air mixtures N83-29231
CO + H sub 2 reactions over nitrogen-modified iron catalysts
[DE83-006579] N83-29335
Static and seismic lateral pressures on Earth retaining structures, appendices
[PB83-164335] N83-29476
Analytical design of multispectral sensors
[E83-10337] N83-29748
Evaluation of the radiometric quality of the TM data using clustering and multispectral distance measures N83-29762
Spatial resolution estimation of LANDSAT-4 TM and MSS data N83-29766
Direct enzymatic extraction of starch from corn as an energy-saving alternative to production of high-fructose syrup
[DE82-008314] N83-29822
Forced- and natural-convection studies on solar collectors for heating and cooling applications
[DE83-009863] N83-29841
Development of selection criteria and their application in evaluation of CELSS candidate species N83-30021
Candidate species selection: Cultural and photosynthetic aspects N83-30022

Direct observation of time-temperature-transformation curves for crystallization of ice from solutions by a homogeneous mechanism
[AD-A126044] N83-30279

R

RADIO TECHNICAL COMMISSION FOR AERONAUTICS, WASHINGTON, D. C.
Minimum operational performance standards for emergency locator transmitters. Automatic fixed, ELT (AF); automatic portable, ELT (AP); automatic deployable, ELT (AD); survival, ELT (S) operating on 121.5 and 243.0 megahertz
[RTCA/DO-183] N83-29488
RAND CORP., SANTA MONICA, CALIF.
Rand data base of Soviet high-current particle-beam R&D
[AD-A125536] N83-30181
RCA GOVERNMENT AND COMMERCIAL SYSTEMS, PRINCETON, N. J.
Satellite moisture retrieval techniques. Volume 1: Technique development and evaluation
[AD-A126245] N83-29933
RENSSELAER POLYTECHNIC INST., TROY, N. Y.
Microstructure and fatigue behavior of 3 nickel base eutectic composites
[AD-A125571] N83-29369
The development of refractory metallization for high-speed VISI circuits
[AD-A125783] N83-29598
RESEARCH INST. OF NATIONAL DEFENCE, LINKOEPING (SWEDEN).
Statistics on the fine scale structure of rain in Stockholm, 1977-1979 N83-29521
Matching edges in maps and aerial images using the chamfer matching algorithm
[FOA-C-30315-E1] N83-29791
RESEARCH INST. OF NATIONAL DEFENCE, UMEA (SWEDEN).
Microbial degradation of oil: Research and development 1982, TOBOS 85 program
[FOA-C-40167-B4] N83-29881
RICE UNIV., HOUSTON, TEX.
Programs for solving polynomial equations
[PB83-167171] N83-30089
RIO GRANDE ASSOCIATES, HOUSTON, TEX.
On the variance of probability estimates with correlated data
[AD-A126336] N83-30153
ROCHESTER UNIV., N. Y.
Quantum dynamical model for laser excitation of a two-level adatom: Surface-dressed Bloch equations
[AD-A126201] N83-29696
Theory of reactions at a solid surface
[AD-A126202] N83-29697
Microwaves and human leukocyte function
[AD-A124000] N83-29998
ROCKETDYNE, CANOGA PARK, CALIF.
Downhole steam-generator study. Volume 2: Design summary
[DE82-019824] N83-29852
ROCKWELL INTERNATIONAL CORP., CANOGA PARK, CALIF.
Commercial high-level-waste management: Options and economics. A comparative analysis of the ceramic and glass waste forms
[DE83-006235] N83-30218
ROCKWELL INTERNATIONAL CORP., DOWNEY, CALIF.
Degassifying and mixing apparatus for liquids
[NASA-CASE-MSC-18936-1] N83-29652
Teleoperator Maneuvering System (TMS) benefits assessment study. Volume 1: Executive summary
[NASA-CR-170795] N83-30034
Teleoperator maneuvering system benefits assessment, volume 2
[NASA-CR-170796] N83-30035
ROCKWELL INTERNATIONAL CORP., GOLDEN, COLO.
Process for producing oxygen
[DE83-006648] N83-29344
ROCKWELL INTERNATIONAL CORP., PITTSBURGH, PA.
Portable 90 deg proof loading device
[NASA-CASE-MSC-20250-1] N83-29707
ROCKWELL INTERNATIONAL CORP., RICHLAND, WASH.
Hanford solid-waste handling facility strategy
[DE82-017163] N83-30215
ROCKWELL INTERNATIONAL CORP., THOUSAND OAKS, CALIF.
Integrated optical transmitter and receiver
[AD-A125493] N83-29575
ROLLS-ROYCE LTD., BRISTOL (ENGLAND).
Effects of intake flow distortion on engine stability N83-29257
ROLLS-ROYCE LTD., DERBY (ENGLAND).
Mechanical and thermal effects on the transient and steady state component performance of gas turbines N83-29252
Use of composites in aero-engines
[PNR-90149] N83-29322
Transducer reliability in engineering research and development
[PNR-90147] N83-29669
Improving the accuracy of thermocouple temperature measuring circuits
[PNR-90148] N83-29670
ROME UNIV. (ITALY).
Amplitude scintillation in propagation paths above 10 GHz N83-29508
Effects of the atmosphere on image resolution in microwave radiometry N83-29530
Radiometric sensing of the atmospheric boundary layer N83-29533
ROSENBERG (PAUL) ASSOCIATES, PELHAM, N. Y.
Navigation: National plans; NAVSTAR-GPS; Laser gyros
[AD-A125533] N83-29194
ROSENTHAL-STEMAG, TECHNISCHE KERAMIK A.G., SELB (WEST GERMANY).
Development of high-temperature resistant, noncorrosible, nonmetallic ceramic materials, especially silicon nitride, for heat exchangers in gas turbine application
[BMFT-FB-T-83-026] N83-29408
ROYAL NETHERLANDS AIR FORCE, VOLKEL.
Operational and maintenance aspects of the introduction of an advanced fighter type N83-29250
ROYAL NORWEGIAN COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH, KJELLER.
Wave propagation and remote sensing N83-29495
On the use of communication concepts and techniques for remote sensing N83-29545
The Norwegian seismic array (NORSAR)
[AD-A126249] N83-29898
RUHR UNIV., BOCHUM (WEST GERMANY).
On electromagnetic methods in geophysical probing N83-29547
RUTHERFORD HIGH ENERGY LAB., CHILTON (ENGLAND).
GKS (Graphical Kernel System), the first graphics standard
[PB83-166595] N83-30090
A review of currently available high performance interactive graphic systems
[PB83-165951] N83-30091

S

SAN JOSE STATE UNIV., CALIF.
Mineral separation in a CELSS by ion-exchange chromatography N83-30033
SANDIA LABS., ALBUQUERQUE, N. MEX.
Full-scale turbine-missile-casing tests
[DE83-007427] N83-29310
Relative catalytic activity of iron containing minerals for the hydrogasification of coal
[DE82-012776] N83-29337
Pyrotechnic deflagration velocity and permeability
[DE82-014100] N83-29428
Shock sensitivity of the explosive 2-(5-cyanotetrazolato) pentaamine cobalt(3) perchlorate (CP)
[DE82-013637] N83-29429
The characterization and performance of thirteen boron/calcium chromate pyrotechnic blends, 2
[DE82-014693] N83-29430
Water release from heated concretes
[DE82-015196] N83-29457
Rapid annealing in advanced bipolar microcircuits
[DE82-018772] N83-29616
Optically Recording Velocity Interferometer System (ORVIS) for subnanosecond particle-velocity measurements in shock waves
[DE82-017621] N83-29659
A data memory system for a seafloor-earthquake-measuring instrument
[DE82-016808] N83-29665
An experimental study of single media thermocline thermal-energy storage
[DE82-006769] N83-29823
Manufacturing and cost analyses of heliostats based on the second-generation heliostat-development study
[DE83-006664] N83-29835
Influence of adhesive shear deformation on laminate structural behavior with application to parabolic trough solar collectors
[DE83-010293] N83-29838
Solar Total Energy Project summary description
[DE83-010232] N83-29842

The 10-MWe central-receiver solar-thermal pilot-plant test operation plan
[DE83-009737] N83-29843
Intermediate photovoltaic system application experiment operational performance report. Volume 6: CDC Light Manufacturing Bldg., San Bernardino, CA for August 1982
[DE83-010390] N83-29844
Conceptual design of a direct-contact natural-gas-fired downhole steam generator
[DE82-019875] N83-29851
The Department of Energy (DOE) research program in structural analysis of vertical-axis wind turbines
[DE82-017072] N83-29858
Material problems in lithium, ambient-temperature, primary batteries
[DE82-010083] N83-29860
Flowing-electrolyte-battery testing and evaluation
[DE82-015258] N83-29861
Permanent damage effects in Si and AlGaAs/GaAs photodiodes
[DE82-018292] N83-29866
Magma source location survey
[DE82-019816] N83-29905
Constant temperature and thermal gradient investigations of the near field subseabed environment: Chemical and thermodiffusional effects
[DE82-018589] N83-29958
Global-error estimation for stiff ODEs
[DE83-006846] N83-30136
Analysis, scale modeling, and full-scale tests of low-level nuclear-waste-drum response to accident environments
[DE83-007587] N83-30217
An elementary approach to the six-port reflectometer, its theory and implementation
[DE82-015514] N83-30233
SANTA CLARA UNIV., CALIF.
The inclusion principle for dynamic systems
[DE83-006412] N83-30140
SCIENCE APPLICATIONS, INC., LA JOLLA, CALIF.
Improved simulations of mesoscale meteorology
[AD-A125815] N83-29928
SCIENCE APPLICATIONS, INC., MCLEAN, VA.
Geophysical plasmas and atmospheric modeling
[AD-A126341] N83-29904
SCIENCE RESEARCH COUNCIL, CHILTON (ENGLAND).
Particle physics experiments, 1981
[PB83-164715] N83-30207
Numerical studies of the intrinsic charm model
[PB83-164798] N83-30208
Determination of the Alpha parameter for the decay of xi minus into Lambda pi minus
[PB83-164814] N83-30209
Survey of models of baryon production in e plus e minus annihilation
[PB83-166850] N83-30212
Limits on neutrino-antineutrino transitions from a study of high energy neutrino interactions
[PB83-165944] N83-30213
Spatially and spectraly resolved filamentary structures in the (3/2)omega 0 emission from laser produced plasmas
[PB83-165969] N83-30264
First three years of IUE (International Ultraviolet Explorer satellite)
[PB83-166496] N83-30337
Detailed observations of NGC 4151 with IUE (International Ultraviolet Explorer). Paper 2: Variability of the continuum from 1978 February to 1980 May, including X-ray and optical observations
[PB83-164947] N83-30338
SCIENCE RESEARCH COUNCIL, DARESBURY (ENGLAND).
Topics in heavy ion reactions
[PB83-164939] N83-30210
SCIENTIFIC RESEARCH ASSOCIATES, INC., GLASTONBURY, CONN.
Semiconductor materials for high frequency solid state sources
[AD-A126242] N83-30276
SCIENTIFIC TRANSLATION SERVICE, SANTA BARBARA, CALIF.
An investigation of the basic characteristics of the radiation of straight xenon flash tubes
[DE82-016680] N83-29614
SCRIPPS INSTITUTION OF OCEANOGRAPHY, LA JOLLA, CALIF.
The interaction of short-wavelength internal waves with a background current
[AD-A125822] N83-29581
SIEMENS A.G., MUNICH (WEST GERMANY).
Microelectronic position sensors
[BMFT-FB-T-83-034] N83-29375
Methods of submicron analysis as assistance for semiconductor technology
[BMFT-FB-T-83-032] N83-30288

Display subsystems with liquid crystals
[BMFT-FB-T-83-047] N83-30289
IC-components with monolithic thin layer capacitors
[BMFT-FB-T-83-049] N83-30290
SIGMA RESEARCH, INC., RICHLAND, WASH.
Optical probe for steam-generator-tube dent measurement
[DE83-901484] N83-29668
SIKORSKY AIRCRAFT, STRATFORD, CONN.
Development of rotorcraft interior. Noise control concepts. Phase 1: Definition study
[NASA-CR-166101] N83-30166
SOCIETE NATIONALE D'ETUDES ET DE CONSTRUCTION DE MOTEURS D'AVIATION, MOISSY-CRAMAYEL (FRANCE).
The matrix of axial and radial plays: The present situation and perspectives N83-29253
SOIL TEST SERVICES, INC., NORTHBROOK, ILL.
Sensing systems for measuring mechanical properties in ground masses. Volume 2: In situ testing with the Menard pressuremeter
[PB83-155952] N83-29792
SONICRAFT, INC., CHICAGO, ILL.
Single and multiple scattered solar radiation
[AD-A126323] N83-30349
SOUTH CAROLINA UNIV., COLUMBIA.
Earthquakes and earthquake predictions: Simulating their economic effects
[PB83-163725] N83-29939
Thermodynamic consistency test procedure using orthogonal collocation and the Peng-Robinson equation of state
[DE83-007168] N83-30293
SOUTHWEST RESEARCH INST., SAN ANTONIO, TEX.
Evaluation of fuel additives for reduction of material imcompatibilities in methanol-gasoline blends
[NASA-CR-168061] N83-29359
Emission characterization of a spark-ignited, heavy-duty, direct-injected methanol engine
[PB83-156372] N83-29722
SRI INTERNATIONAL CORP., MENLO PARK, CALIF.
Recovery of hydrogen from hydrogen sulfide: Bench scale studies of the reaction of hydrogen sulfide with liquid copper
[DE83-005947] N83-29336
Development of software fault-tolerance techniques
[NASA-CR-172122] N83-30052
Diagnostics development for E-beam excited air channels. Conductivity measurements in air afterglows
[AD-A125997] N83-30174
STANDARD ELEKTRIK LORENZ A.G., STUTTGART (WEST GERMANY).
Ferroelectric thin films for imaging and signaling techniques
[BMFT-FB-T-83-015] N83-30287
STANFORD LINEAR ACCELERATOR CENTER, CALIF.
Glueballs: A status report
[DE82-009519] N83-30188
New-particle spectroscopy, quarkonium and gluonic mesons
[DE83-007012] N83-30203
Quark-antiquark bound-state spectroscopy and QCD
[DE83-007062] N83-30204
STANFORD UNIV., CALIF.
Velocity visualization in gaseous flows N83-29223
Upper tropospheric structures observed with VHF radar at Arecibo N83-29507
Joint Services Electronics Program, Stanford University
[AD-A126140] N83-29602
Stability analysis of finite difference schemes for the advection-diffusion equation
[NASA-CR-172823] N83-30123
Moments of the minimum of a random walk and complete convergence
[AD-A125768] N83-30148
Selecting representative points in normal populations
[AD-A125770] N83-30149
Effects of surface preparation on the properties of single crystal CdTe junctions N83-30266
The 3 papers on rule-based estimation of statistics on databases
[AD-A126196] N83-30310
Research in space commercialization, technology transfer and communications
[NASA-CR-172886] N83-30326
Research in space commercialization, technology transfer and communications
[NASA-CR-172887] N83-30327
Spicules and surges. Part 1: Examination of two possible models
[NASA-CR-172778] N83-30347
STATE UNIV. OF NEW YORK, STONY BROOK.
Energy transport in porous-insulator systems. 2: Performance of vertical enclosures
[DE82-019894] N83-29643
STEAM AND FUEL USERS' ASSOCIATION OF INDIA, MADRAS.
Proceedings of a National Seminar on Energy Challenge of the Eighties
[PB83-164764] N83-29442
STICHTING MATHEMATISCH CENTRUM, AMSTERDAM (NETHERLANDS).
A finite flag-transitive geometry of extended G2-type
[MC-ZW-176/82] N83-30141
STUTTGART UNIV. (WEST GERMANY).
New pulsed far infrared laser lines in D2O
[IPF-82-13] N83-29701
Ion acceleration in the plasma focus
[IPF-82-6] N83-30257
Numerical solution of plasma wave phenomena
[IPF-82-8] N83-30258
Self organization phenomena in the plasma focus
[IPF-82-9] N83-30259
The influence of the deviation from the equilibrium deuteron distribution on the neutron spectra in linear pinch geometries
[IPF-82-10] N83-30260
Beta increase in a belt pinch plasma by fast magnetosonic wave heating
[IPF-82-11] N83-30261
Investigation of the neutron production phases of a large plasma focus device
[IPF-82-12] N83-30262
Materials characterization of silicon and analysis of recombination processes and impurities
[BMFT-FB-T-83-06] N83-30291
SVERIGES GEOLOGISKA UNDERSOEKNING, UPPSALA.
Roede formation: Early old red sandstone facies in the Silurian of Jaemtland Sweden
[PB83-165521] N83-29917
SWEDISH DETONIC RESEARCH FOUNDATION, STOCKHOLM.
Simple strength tests on and hydraulic fracturing of rock material
[PB83-165514] N83-29918
Analysis of the internal point load test
[PB83-164566] N83-29919
SYSTEMS CONTROL TECHNOLOGY, INC., WEST PALM BEACH, FLA.
Emergency Medical Service (EMS): Rotorcraft Technology Workshop
[NASA-CR-166495] N83-30325
SYSTEMS SCIENCE AND SOFTWARE, LA JOLLA, CALIF.
Advanced seismological research and improved yield determination
[AD-A126001] N83-29895
Seismological discrimination and yield determination research
[AD-A126002] N83-29896
Advanced seismological research and improved yield determination
[AD-A125508] N83-29903

T

TECHNION - ISRAEL INST. OF TECH., HAIFA.
Convergence characteristics of nonlinear vortex-lattice methods for configuration aerodynamics
[NASA-TM-84371] N83-29181
TECHNISCHE HOCHSCHULE, AACHEN (WEST GERMANY).
Operational engine usage N83-29246
External development and production of integrated circuits
[BMFT-FB-T-83-022] N83-29621
TECHNISCHE HOCHSCHULE, DARMSTADT (WEST GERMANY).
Theoretical investigations of particle behavior in the high velocity domain
[IFD-2/82] N83-29183
Structure and properties of nickel-boron-layers
[BMFT-FB-T-82-241] N83-29374
TECHNISCHE HOGESCHOOL, DELFT (NETHERLANDS).
A contribution to the numerical description of rotating two phase flow
[WTHD-153] N83-29647
Vibroseismic excitation of elastic waves in a semi-infinite solid
[PB83-165365] N83-29916
Plate tectonic behaviour in the east Mediterranean region to be detected by baseline variations from satellite laser ranging
[PB83-159772] N83-29920
Survey of some results from the theory of stochastic approximations with a view to system identification
[PB83-161943] N83-30142
Least-square iterative technique for solving time-domain scattering problems
[PB83-164913] N83-30143
Propagation properties of surface-wave modes in a quasi-multimode, uniaxially anisotropic, graded-index optical waveguide with circularly cylindrical symmetry
[PB83-165167] N83-30235
Solid-liquid contacting in industrial crystalizers and its influence on product size distribution
[WTHD-150] N83-30270
TECHNISCHE HOGESCHOOL, EINDHOVEN (NETHERLANDS).
A comparison of radio wave and in situ observations of tropospheric turbulence and wind velocity N83-29506
TECHNISCHE UNIVERSITAET, MUNICH (WEST GERMANY).
Generalized digital simulation technique with variable engine parameter input for steady state and transient behaviour of aero gas turbines N83-29263
TEXAS A&M UNIV., COLLEGE STATION.
Air pollutant production by algal cell cultures N83-30032
TEXAS INSTRUMENTS, INC., DALLAS.
Superconducting niobium thin-film gradiometer technology program
[AD-A126133] N83-29656
TEXAS TECHNOLOGICAL UNIV., LUBBOCK.
Crosbyton Solar Power Project. Volume 8: Preliminary design of 55-MWe solar-fossil hybrid electric power plant at Crosbyton, Texas
[DE83-005285] N83-29832
TEXAS TRANSPORTATION INST., COLLEGE STATION.
Field environmental evaluation plan for sulfur use in pavements
[PB83-156687] N83-29461
TEXAS UNIV., AUSTIN.
A successive linear programming method and its convergence on nonlinear problems
[AD-A126240] N83-30070
A saddle value characterization of Fan's equilibrium points
[AD-A126237] N83-30120
Representation of multivariate functions
[AD-A125898] N83-30132
Efficient tree handling procedures for allocation/processing networks
[AD-A126238] N83-30156
Invariant multiplicative efficiency and piecewise Cobb-Douglas envelopments
[AD-A126239] N83-30157
Topics in plasma instabilities: Trapped-particle modes and MHD
[DE82-019194] N83-30253
Experimental determination of the thin film growth mechanism N83-30267
Semiconductor electrodes. 50: Effect of mode of illumination and doping on photoelectrochemical behavior of phthalocyanine films
[AD-A125856] N83-30274
TEXAS UNIV. AT DALLAS, RICHARDSON.
Investigation of the effects of external current systems on the MAGSAT data utilizing grid cell modeling techniques
[E83-10358] N83-29769
TEXTRON BELL HELICOPTER, FORT WORTH, TEX.
Adaptation of pultrusion to the manufacture of helicopter components
[AD-A126291] N83-29171
THERMAL TECHNOLOGY LABS., BUFFALO, N. Y.
Design and development of multi-kW power electronic transformers
[NASA-CR-168082] N83-29596
THERMO ELECTRON CORP., WALTHAM, MASS.
Laser-activated electrical switching characteristics of high-current, low-loss thermionic diodes
[AD-A125521] N83-29609
THERMO ELECTRON ENGINEERING CORP., WALTHAM, MASS.
Glass batch preheater, phase 3
[PB83-167254] N83-29478
THESSALONIKI UNIV. (GREECE).
Generalized approach to radio wave scatter from time-varying rough surfaces N83-29537
TOKYO UNIV. (JAPAN).
Japanese MAGSAT team
[E83-10366] N83-29777
TRANSCO PRODUCTS, INC., ARCADIA, CALIF.
Transco medium-Btu coal gasification project. Executive summary
[DE82-009598] N83-29418
TRANSPORTATION SYSTEMS CENTER, CAMBRIDGE, MASS.
Noise test-resilient wheels Massachusetts Bay Transportation Authority green line
[PB83-148635] N83-30329

TRI-STATE SYNFUELS CO., HOUSTON, TEX.
Tri-State Synfuels project commercial scale coal test. Volume 2A: Collection and shipment mine, barge, ship and train programs
[DE83-007443] N83-29431
Commercial scale coal test. Volume 4: Coal fines utilization in furnace boilers
[DE83-007450] N83-29433
Commercial scale coal test. Volume 1: Selection of camp 1 coal
[DE83-007436] N83-29435
TRW ELECTRONIC COMPONENTS GROUP, PHILADELPHIA, PA.
Field expedient repair of fiber optic cables
[AD-A126075] N83-30225
TRW ENERGY SYSTEMS, REDONDO BEACH, CALIF.
Coal-fired MHD combustion development project: Phase 3B
[DE82-015176] N83-29863
TULSA UNIV., OKLA.
Environmental assessment data base for petroleum refining wastewaters and residuals
[PB83-164749] N83-30316

U

UNION CARBIDE CORP., OAK RIDGE, TENN.
Hydrogeochemical and stream sediment reconnaissance basic data for Bangor and Bath quadrangles, Maine
[DE83-005630] N83-29788
UNITED TECHNOLOGIES CORP., SOUTH WINDSOR, CONN.
Evaluation of synthetic-fuel-character effects on rich-lean stationary-gas-turbine combustion systems. Volume 1: Subscale test program
[DE83-901452] N83-29715
Task 4 completion report for 40 Kilowatt grid connected modification contract
[NASA-CR-167950] N83-30297
UNITED TECHNOLOGIES CORP., STRATFORD, CONN.
Development of monofilar rotor hub vibration absorber
[NASA-CR-166088] N83-29272
UNITED TECHNOLOGIES RESEARCH CENTER, EAST HARTFORD, CONN.
Axial compressor middle stage secondary flow study
[NASA-CR-3701] N83-29174
Analytical modeling of operating characteristics of premixing-prevaporizing fuel-air mixing passages N83-29209
Mass and momentum turbulent transport experiments N83-29222
Investigation of the feasibility of temperature profiling optical diagnostics in the SSME fuel pre-burner
[NASA-CR-170799] N83-29308
Large-scale separation and wake closure/reattachment. The cascade problem
[UTRC83-13] N83-29629
Nonuniqueness in wakes and boundary layers
[UTRC83-15] N83-29630
UNIVERSITE CATHOLIQUE DE LOUVAIN (BELGIUM).
Wave propagation in precipitation N83-29496
First global results of the European Space Agency OTS propagation campaign N83-29511
Correlation between various radioelectrical data at 11.4, 11.6, and 35 GHz N83-29513
Evaluation of an effective medium temperature from radiometric-satellite beacons comparisons N83-29526
Comparison of two methods for estimating the water vapor correction to altimeter readings from radiometric measurements N83-29541
Definition of standards and methods of calibrating for Imaging Microwave Radiometers (IMR)
[ESA-CR(P)-1724] N83-29671
UNIVERSITE DES SCIENCES ET TECHNIQUES DE LILLE (FRANCE).
Response of a layer to sinusoidal or impulsive electromagnetic excitation: Approximation of the thin plate N83-29548
UNIVERSITY COLL., LONDON (ENGLAND).
Einstein X-ray observations of cataclysmic variables
[DE82-015804] N83-30352
UNIVERSITY OF CENTRAL FLORIDA, ORLANDO.
Some new practical models for visibility for German locations where no records exist
[AD-A126339] N83-29936
UNIVERSITY OF PETROLEUM AND MINERALS, DHAHRAN (SAUDI ARABIA).
Measurements of the complex refractive index of soils and airborne particles N83-29515
UNIVERSITY OF SOUTHERN CALIFORNIA, LOS ANGELES.
Kinetic studies of gas phase free radicals
[AD-A125516] N83-29688
UNIVERSITY OF SOUTHERN CALIFORNIA, MARINA DEL REY.
Communication environments for local networks
[AD-A125441] N83-29573
Automated protocol verification
[AD-A126271] N83-30066
UNIVERSITY OF TECHNOLOGY, BAGHDAD (IRAQ).
Effects of dust/sandstorm on some aspects of microwave propagation N83-29516
UNIVERSITY OF WESTERN ONTARIO, LONDON.
Microwave multipath from sea reflections: The Bay of Fundy N83-29500
URBAN MASS TRANSPORTATION ADMINISTRATION, WASHINGTON, D.C.
Microcomputers in transportation. Volume 1: Selected readings
[PB83-169904] N83-30048
UTAH GEOLOGICAL AND MINERALOGICAL SURVEY, SALT LAKE CITY.
Evaluation of low-temperature geothermal potential in Cache Valley, Utah
[DE83-001219] N83-29790
UTAH STATE UNIV., LOGAN.
Studies on maximum yield of wheat and other small grains in controlled environments N83-30024
UTAH UNIV., SALT LAKE CITY.
Silicon carbide alloys
[AD-A125968] N83-29398
The S-matrix and acoustic signal structure in simple and compound waveguides
[AD-A125583] N83-30129

V

VIRGINIA POLYTECHNIC INST. AND STATE UNIV., BLACKSBURG.
A continuous vorticity panel method for the prediction of steady aerodynamic loads on lifting surfaces N83-29172
Study of an automatic trajectory following control system
[NASA-CR-166121] N83-29271
The effect of extreme temperatures on the elastic properties and fracture behavior of graphite/polyimide composites
[NASA-CR-172143] N83-29315
Stress intensity factor distribution for natural flaws grown under mode 1 loading using 3-d photoelasticity N83-29730
VIRGINIA UNIV., CHARLOTTESVILLE.
Minimum noise impact aircraft trajectories N83-29191
Multiaccess of a slotted channel using a control mini-slot
[AD-A125569UVA-525634/EE82/106] N83-29562
Flow in a partially filled rotating cylinder N83-29626
Flow in a partially filled rotating cylinder
[DE82-016309] N83-29644
VITRO LABS., SILVER SPRING, MD.
Solar energy system performance evaluation. Scottsdale Courthouse, Scottsdale, Arizona, March, April, July, August, and October 1981 through February 1982
[DE82-019030] N83-29854
Solar energy system performance evaluation. Crown Realty 1, Lakewood, Colorado, December 1981 through March 1982
[DE82-019029] N83-29855
VOLKSWAGEN A.G., WOLFSBURG (WEST GERMANY).
Development of ceramic automobile turbine engine components
[BMFT-FB-T-83-025] N83-29407
VOUGHT CORP., DALLAS, TEX.
Development of deployable structures for large space platform systems, volume 2
[NASA-CR-170800] N83-29305

W

WALES UNIV. INST. OF SCIENCE AND TECHNOLOGY, CARDIFF.
One-hundred GHz open-resonator measurements of artificial precipitation and fog propagation parameters N83-29522
WASHINGTON STATE UNIV., PULLMAN.
Venturi design for metering solids flow in gas-solids suspensions
[DE83-004314] N83-29660
WASHINGTON UNIV., SEATTLE.
Fast computational kinetics program N83-29227
Synfuel from fusion: Using the tandem mirror reactor and a thermochemical cycle to produce hydrogen
[DE83-005216] N83-29424
Adverse pressure gradient corner flows
[AD-A126059] N83-29639
Elastomeric bearings design, construction and materials
[PB83-149211] N83-29723
The 1980 land cover for the Puget Sound region
[E83-10360] N83-29771
Physical considerations in the analysis and synthesis of hydrologic sequences
[PB83-167593] N83-29938
Multiple scattering effects on transmission through the atmosphere
[AD-A126010] N83-30226
Confinement and heating of high-beta plasmas with emphasis on compact toroids. Task 2: High-beta Q-machine experiment
[DE82-020341] N83-30239
WASHINGTON UNIV., ST. LOUIS, MO.
Total System Design (TSD) methodology assessment
[AD-A126101] N83-30158
WEATHER SQUADRON (7TH), APO NEW YORK 09093. DETACHMENT 1.
Terminal forecast reference notebook for Feucht AAF, Germany
[AD-A126096] N83-29931
WEATHER SQUADRON (7TH), APO NEW YORK 09326. DETACHMENT 5.
Terminal forecast reference notebook for Katterbach AAF, Germany
[AD-A126097] N83-29932
WEATHER SQUADRON (28TH), (MAC), NEW YORK 09127.
Terminal forecast reference notebook for RAF Fairford, United Kingdom
[AD-A126095] N83-29930
WED ENTERPRISES, GLENDALE, CALIF.
Water-hyacinth production primary and advanced treatment of wastewater
[DE83-006033] N83-29880
WEST VIRGINIA UNIV., MORGANTOWN.
Numerical calculations of space-harmonic and full-wave scattering models N83-29534
ART and SIRT correction factors in geotomography N83-29539
WESTON OBSERVATORY, MASS.
Amplitude and phase of surface pressure produced by space transportation system: Mission 5
[AD-A125846] N83-29300
WISCONSIN UNIV., MADISON.
Candidate species selection and controlled environment injuries N83-30023
Multivariable internal model control
[DE83-007320] N83-30101
Collisional energy transfer in highly vibrationally excited molecules
[AD-A126047] N83-30180
WOODS HOLE OCEANOGRAPHIC INSTITUTION, MASS.
The long term upper ocean study (LOTUS) cruise summary and hydrographic data report OCEANUS 119, May 1982
[AD-A125737] N83-29956
Frictional secondary circulation near an upwelled thermocline
[PB83-162024] N83-29965
WUHAN UNIV. (CHINA).
Rain rate profile effects on radiowave attenuation above 10 GHz N83-29520
WYOMING UNIV., LARAMIE.
Laminate analyses, micromechanical creep response, and fatigue behavior of polymer matrix composite materials
[AD-A125784] N83-29316

X

XEROX PALO ALTO RESEARCH CENTER, CALIF.
Competitive argumentation in computational theories at cognition
[AD-A125577] N83-30009

Y

YALE UNIV., NEW HAVEN, CONN.
Components of individual differences in human intelligence
[AD-A125633] N83-30012
Multi-gold algorithms with applications to elliptic boundary-value problems
[AD-A125769] N83-30114

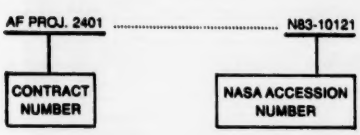
Z

ZEOPOWER CO., NATICK, MASS.
Development of low-cost integrated zeolite collector, supplement
[DE83-008484] N83-29840

ZWECKVERBAND LANDESWASSERVERSORGUNG, STUTTGART (WEST GERMANY).
Compact flocculation system with sludge and separators and thickeners at the Langenau Waterworks. Development and construction of a high-capacity flocculation system
[BMFT-FB-T-83-037] N83-29459

CONTRACT NUMBER INDEX

Typical Contract Number Index Listing



Listings in this index are arranged alphanumerically by contract number. Under each contract number the NASA accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order. The NASA accession number denotes the number by which the citation is identified.

AF PROJ. C503 ..... N83-29692
AF PROJ. C854 ..... N83-29307
AF PROJ. LDFP N83-30099
AF PROJ. 06AL N83-29970
AF PROJ. 627A N83-29564
AF PROJ. 1900 ..... N83-29870
AF PROJ. 2029 ..... N83-29578
AF PROJ. 2277 ..... N83-29658
AF PROJ. 2301 ..... N83-29690
AF PROJ. 2303 ..... N83-29403
N83-29688
N83-30175
AF PROJ. 2304 ..... N83-29562
N83-30115
N83-30116
N83-30127
N83-30298
AF PROJ. 2306 ..... N83-29369
N83-30272
AF PROJ. 2310 ..... N83-29905
AF PROJ. 2313 ..... N83-29999
N83-30000
N83-30011
N83-30151
AF PROJ. 2338 ..... N83-30227
AF PROJ. 2401 ..... N83-29275
AF PROJ. 2418 ..... N83-29317
N83-29726
AF PROJ. 2419 ..... N83-29318
AF PROJ. 2781 ..... N83-29929
AF PROJ. 3145 ..... N83-30163
AF PROJ. 3205 ..... N83-30158
AF PROJ. 3763 ..... N83-30273
AF PROJ. 4519 ..... N83-29571
N83-29579
AF PROJ. 4594 ..... N83-29580
N83-30128
AF PROJ. 4643 ..... N83-29901
N83-30064
N83-30065
AF PROJ. 5581 ..... N83-30071
AF PROJ. 6096 ..... N83-30277
AF PROJ. 6323 ..... N83-30067
AF PROJ. 6430 ..... N83-29578
AF PROJ. 6670 ..... N83-29682
N83-29936
AF PROJ. 6687 ..... N83-29454
AF PROJ. 7231 ..... N83-29190
N83-29968
N83-29969
AF PROJ. 7600 ..... N83-29300
N83-29902
N83-30121
AF PROJ. 7661 ..... N83-29299
AF PROJ. 7670 ..... N83-30349
AF PROJ. 7757 ..... N83-29998
AF PROJ. 9993 ..... N83-29897
N83-30153
AF-AFOSR-0007-79 ..... N83-29403
AF-AFOSR-0015-80 ..... N83-29369
AF-AFOSR-0029-80 ..... N83-30298
AF-AFOSR-0030-82 ..... N83-29562
AF-AFOSR-0045-80 ..... N83-30000
AF-AFOSR-0046-82 ..... N83-29696
N83-29697
AF-AFOSR-0087-82 ..... N83-29361
AF-AFOSR-0107-81 ..... N83-29177
AF-AFOSR-0128-81 ..... N83-29690
AF-AFOSR-0148-80 ..... N83-29637
AF-AFOSR-0158-80 ..... N83-30115
N83-30127
AF-AFOSR-3271-77 ..... N83-30116
AF-AFOSR-3633-78 ..... N83-30096
N83-30100
AF-AFOSR-3693-78 ..... N83-29688
ARO-101-83 ..... N83-29556
ARPA ORDER 2551 ..... N83-29895
N83-29896
N83-29898
N83-29903
ARPA ORDER 3214 ..... N83-29563
ARPA ORDER 3414 ..... N83-30072
ARPA ORDER 3597 ..... N83-30044
N83-30076
ARPA ORDER 3654 ..... N83-29307
ARPA ORDER 3797 ..... N83-29611
ARPA ORDER 4128 ..... N83-30174
ARPA ORDER 4395 ..... N83-30179
ARPA ORDER 4599 ..... N83-30276
A77/KL/062 ..... N83-29389
DA PROJ. 1L1-61102-A-71A N83-29274
N83-29558
DA PROJ. 1L1-61102-AH-43 ..... N83-30152
DA PROJ. 1L1-61102-AH-60 ..... N83-29736
DA PROJ. 1L1-61102-B-53A N83-29928
DA PROJ. 1L1-62209-AH-76 ..... N83-29174
N83-29201
DA PROJ. 1L1-62601-AH-91 ..... N83-29194
DA PROJ. 1L1-62622-A-552 ..... N83-29693
DA PROJ. 3M1-61102-BS-10 ..... N83-29971
N83-29997
DA PROJ. 3S1-62775-A-825 ..... N83-29401
DA PROJ. 4A1-61102-AT-22 ..... N83-29906
DA PROJ. 4KD-78012-AAM-1 ..... N83-29455
DAAE07-81-G-4006 ..... N83-29899
DAAG29-79-C-0145 ..... N83-30133
DAAG29-79-C-0170 ..... N83-29685
DAAG29-79-C-0189 ..... N83-29316
DAAG29-79-C-0214 ..... N83-30131
DAAG29-79-G-0042 ..... N83-29398
DAAG29-80-C-0035 ..... N83-29368
DAAG29-80-C-0045 ..... N83-29397
DAAG29-80-K-0039 ..... N83-30132
DAAG29-81-C-0004 ..... N83-29398
DAAG29-81-K-0057 ..... N83-29602
DAAG29-81-K-0158 ..... N83-29559
DAAG46-79-C-0089 ..... N83-29171
DAAG46-80-C-0056 ..... N83-29399
DAAG53-76-C-0138 ..... N83-30013
DAAK10-81-C-0316 ..... N83-30078
DAAK11-79-C-0100 ..... N83-29693
DAAK21-82-C-0097 ..... N83-30302
DAAK30-80-C-0073 ..... N83-29194
DAAK70-79-C-0121 ..... N83-29576
DAAK70-79-Q-0449 ..... N83-30074
DAAK80-81-C-0085 ..... N83-30225
DAEA18-73-A-0127 ..... N83-29928
DAMD17-75-C-5044 ..... N83-29401
DARPA ORDER 3206 ..... N83-30013
DARPA ORDER 3817 ..... N83-29684
DARPA ORDER 4036 ..... N83-29575
DARPA ORDER 4385 ..... N83-30037
DE-AB01-76CS-31020 ..... N83-29456
DE-AC01-79CS-30027 ..... N83-29854
N83-29855
DE-AC01-79EV-10021 ..... N83-29937
DE-AC01-80ET-17005 ..... N83-29718
DE-AC01-80EV-10453 ..... N83-29871
DE-AC01-82EP-12079 ..... N83-29877
DE-AC02-76CH-00016 ..... N83-29336
N83-29740
N83-29872
N83-29874
N83-30087
N83-30294
DE-AC02-76CH-03000 ..... N83-30295
DE-AC02-76CH-03073 ..... N83-30201
DE-AC02-76ER-02383 ..... N83-30135
DE-AC02-76ER-03117 ..... N83-29345
DE-AC02-76ER-12408 ..... N83-29738
DE-AC02-77CH-00178 ..... N83-29826
N83-29830
N83-29831
N83-29833
N83-29845
N83-29856
N83-29857
N83-29860
DE-AC02-78ER-05002 ..... N83-30280
DE-AC02-78ET-51013 ..... N83-29613
N83-30247
DE-AC02-79ET-15419 ..... N83-30284
DE-AC02-79EV-10237 ..... N83-29312
DE-AC02-80-ER-10651 ..... N83-30160
DE-AC02-80ER-10556 ..... N83-29737
DE-AC02-80ER-10645 ..... N83-30101
DE-AC02-80ER-10677 ..... N83-29334
DE-AC02-80EV-10328 ..... N83-29875
DE-AC02-81ER-10841 ..... N83-30084
DE-AC02-81ER-10902 ..... N83-29972
DE-AC03-76SF-00098 ..... N83-29343
N83-29405
N83-29661
N83-29846
N83-29907
N83-30201
N83-30248
DE-AC03-76SF-00515 ..... N83-30188
N83-30203
N83-30204
DE-AC03-77CS-31591 ..... N83-29829
DE-AC03-78CS-32117 ..... N83-29840
DE-AC03-81SF-11566 ..... N83-29815
N83-29816
DE-AC04-76DP-00053 ..... N83-29340
N83-29370
N83-29617
N83-29867
DE-AC04-76DP-00789 ..... N83-29337
N83-29427
N83-29428
N83-29430
N83-29457
N83-29615
N83-29616
N83-29659
N83-29665
N83-29719
N83-29817
N83-29821
N83-29823
N83-29834
N83-29835
N83-29837
N83-29838
N83-29842
N83-29843
N83-29844
N83-29849
N83-29851
N83-29852
N83-29858
N83-29860
N83-29861
N83-29862
N83-29866
N83-29908
N83-29958
N83-30136
N83-30217
N83-30233
DE-AC04-76DP-03533 ..... N83-29344
DE-AC04-76ET-20255 ..... N83-29832
DE-AC04-78CS-35366 ..... N83-29841
DE-AC05-82OR-20900 ..... N83-29644
DE-AC06-76RL-01830 ..... N83-29312
N83-29332

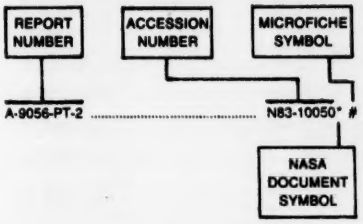
	N83-29432
	N83-29787
	N83-29859
	N83-29873
	N83-30200
DE-AC06-77RL-01030	N83-30215
DE-AC07-76ID-01570	N83-29717
	N83-29879
	N83-29913
	N83-30169
DE-AC07-76SD-01570	N83-30219
DE-AC09-79ET-41900	N83-30218
DE-AC13-76GJ-01664	N83-29788
	N83-29914
DE-AC21-79ET-15158	N83-29534
DE-AC22-79ET-14858	N83-29434
DE-AC22-79ET-14881	N83-29331
DE-AC22-81PC-40502	N83-29863
DE-AI01-76ET-20320	N83-29813
DE-AI01-76ET-20356	N83-29808
	N83-29809
DE-AI01-77CS-51040	N83-30328
DE-AI01-77CS-51044	N83-29811
DE-AI01-81CS-50006	N83-29359
DE-AI01-82ET-20305	N83-29812
DE-AI04-80AL-12726	N83-29326
	N83-29810
DE-AI08-78ET-44802	N83-29909
DE-AI21-80ET-17088	N83-30297
DE-AM0G-76RL-0222S	N83-29424
DE-AS02-76ER-03244	N83-30199
DE-AS02-78CS-40071	N83-29822
DE-AS03-77ET-29138	N83-30140
DE-AS05-76ET-53045	N83-29642
	N83-30252
DE-AS05-79SR-1012	N83-30293
DE-AS07-77ET-28365	N83-29836
DE-AS07-77ET-28393	N83-29790
DE-AS07-79ET-27204	N83-29786
DE-AS08-81DP-40166	N83-30202
DE-AS20-80LC-10335	N83-29848
DE-AS20-80LC-10886	N83-29848
DE-AT03-76ET-51011	N83-29338
	N83-30243
	N83-30251
	N83-30254
DE-AT06-76ET-53047	N83-30239
DE-FC05-81OR-20807	N83-29431
	N83-29433
	N83-29435
DE-FG01-81RA-50381	N83-29418
DE-FG02-81ER-10844	N83-29704
DE-FG02-81R5-10298	N83-29850
DE-FG05-80ET-53088	N83-30253
DE-FG07-80RA-50324	N83-29420
DE-FG07-81ID-12320	N83-29333
DE-FG07-81ID-12322	N83-29422
DE-FG07-81ID-12324	N83-29419
DE-FG07-81ID-12346	N83-29421
DE-FG22-80PC-30212	N83-29660
DE-FG22-81PC-40803	N83-29346
DE-FG22-82PC-50804	N83-29335
DE-TA06-76ET-52047	N83-29424
DEN3-2	N83-29812
DEN3-210	N83-30297
DEN3-287	N83-29359
DI-7-07-83-V0008	N83-29945
DI-14-16-0009-79-120	N83-29890
DI-14-34-0001-1151	N83-29938
DNA001-77-C-0187	N83-30065
DNA001-77-C-0329	N83-29900
DNA001-79-C-0189	N83-30238
DOE-40-1246-82	N83-29618
DOT-CG-948071-A	N83-29387
DOT-FH-11-9363	N83-29792
DOT-FH-11-9364	N83-29793
DOT-FH-11-9457	N83-29461
EDW-C-0008	N83-29386
EG-77-C-01-4042	N83-29828
	N83-29830
	N83-29831
	N83-29833
	N83-29845
	N83-29856
	N83-29857
	N83-29860
EG-77-C-03-1591	N83-29829
EG-77-C-07-1678	N83-29836
EG-77-5-7-1679	N83-29790
EM-78-C-04-5368	N83-29841
EPA-R-803703	N83-29882
EPA-R-804331	N83-29378
EPA-R-804976	N83-29883
EPA-R-805099	N83-30316
EPA-R-805560	N83-29888
EPA-R-806520	N83-29351
EPA-68-02-2547	N83-30094
EPA-68-02-2631	N83-29349
EPA-68-03-3073	N83-29722
EPA68-02-2547	N83-30093
EPRI PROJ. RP-2023-1	N83-29872
	N83-29874
EPRI PROJ. S181-1	N83-29668
EPRI PROJ. 1098	N83-29818
EPRI PROJ. 1484	N83-29820
EPRI PROJ. 1898-1	N83-29715
ESA-4615/81/F-DD(SC)	N83-29671
ESTEC-4535	N83-29546
ESTEC-4702/81	N83-29541
EX-76-C-01-2088	N83-30118
EY-77-S-09-1012	N83-30293
EY01019	N83-29535
FAA PROJ. 045-330-130	N83-29192
FAA PROJ. 182-340-200	N83-29922
FG07-81ID-12321	N83-29423
F04701-82-C-0083	N83-29395
	N83-29691
F04704-81-C-0003	N83-29296
F08606-79-C-0001	N83-29898
F08606-79-C-0008	N83-29895
	N83-29896
	N83-29903
F08635-77-C-0047	N83-29970
F19628-78-C-0100	N83-30175
F19628-79-C-0123	N83-29905
F19628-79-C-0163	N83-29897
F19628-80-C-0002	N83-29564
	N83-29578
	N83-29580
	N83-29610
	N83-29611
	N83-30128
F19628-80-C-0064	N83-29555
	N83-30064
	N83-30065
F19628-80-C-0082	N83-29606
F19628-80-C-0180	N83-30349
F19628-80-C-0184	N83-29682
F19628-81-C-0066	N83-29901
F19628-81-C-0128	N83-30153
F19628-81-K-0001	N83-29953
F19628-81-K-0005	N83-29300
F19628-82-C-0055	N83-29658
F19628-82-C-0071	N83-29454
F19628-82-K-0001	N83-29936
F19628-82-K-0017	N83-29902
	N83-30121
F30602-79-C-0068	N83-29571
	N83-29579
F30602-80-C-0176	N83-30071
F30602-80-C-0241	N83-29692
F30602-80-C-0284	N83-30158
F30602-81-C-0210	N83-30099
F30602-81-C-0260	N83-29307
F33615-78-C-1551	N83-30078
F33615-79-C-0509	N83-29969
F33615-79-C-0514	N83-29968
F33615-79-C-0525	N83-29190
F33615-79-C-1875	N83-30277
F33615-79-C-2057	N83-30163
F33615-79-C-5121	N83-29317
F33615-80-C-5172	N83-29726
F33615-81-C-5049	N83-29318
F33615-81-K-0616	N83-29998
F33615-81-K-1539	N83-30044
	N83-30096
F33615-81-K-1541	N83-30080
F41689-81-C-0012	N83-30151
F49620-79-C-0233	N83-29999
F49620-80-C-0013	N83-30011
F49620-81-C-0089	N83-30272
F49642-82-C-0129	N83-30157
HUD-H-2372	N83-29456
IPA-810-626-1	N83-29175
MDA903-80-C-0353	N83-29563
MDA903-81-C-0335	N83-29573
	N83-30066
MDA903-81-C-0365	N83-30157
MDA903-81-C-0591	N83-30307
	N83-30308
MDA903-82-C-0067	N83-30181
MDA903-82-C-0149	N83-30037
MDA903-82-C-0471	N83-30320
MIPR-FY71218100001	N83-30348
NAG-3340	N83-29725
NAGW-81	N83-30171
	N83-30182
NAGW-92	N83-30347
NAG3-41	N83-29731
	N83-29754
NAG3-190	N83-29211
NASA ORDER A-98346-B	N83-29186
NASA ORDER C-41581-B	N83-29234
NASA ORDER S-50748-A	N83-29551
NASW-3204	N83-30326
	N83-30327
NASW-3247	N83-30054
	N83-30057
	N83-30058
	N83-30060
NASW-3427	N83-30059
NASW-3503	N83-30336
NASW-3541	N83-30042
	N83-30172
	N83-30173
NASW-3542	N83-29313
	N83-29925
	N83-30343
NASW-3616	N83-29992
	N83-29993
NASW-3625	N83-30339
NASW-3644	N83-29491
NAS1-15480	N83-30052
NAS1-15497	N83-30061
	N83-30062
NAS1-15810	N83-30106
NAS1-16156	N83-29198
NAS1-16303	N83-29270
NAS1-16700	N83-29272
NAS1-16727	N83-29314
NAS1-16932	N83-30166
NAS1-16978	N83-30165
NAS1-17070	N83-29177
	N83-29448
	N83-30056
	N83-30107
	N83-30108
	N83-30109
	N83-30110
	N83-30111
	N83-30112
NAS2-10411	N83-30325
NAS2-11555	N83-30053
NAS3-20828	N83-29393
NAS3-21948	N83-29596
NAS3-22039	N83-29178
NAS3-22127	N83-29393
NAS3-22501	N83-29492
NAS3-22762	N83-29221
NAS3-23157	N83-29174
NAS4-2619	N83-29204
NAS5-24335	N83-29775
NAS5-24350	N83-29776
NAS5-26138	N83-29774
NAS5-26309	N83-29769
NAS5-26612	N83-29753
NAS5-26859	N83-29762
	N83-29766
NAS7-100	N83-29595
	N83-29746
	N83-29806
	N83-29808
	N83-29809
	N83-30269
NAS8-3477	N83-29308
NAS8-33107	N83-30271
NAS8-33592	N83-29306
NAS8-33825	N83-30055
NAS8-34678	N83-29305
NAS8-34888	N83-30034
	N83-30035
NAS9-14970	N83-29748
NAS9-15328	N83-29325
NAS9-15466	N83-29748
NAS10-9892	N83-29778
	N83-29779
	N83-29780
	N83-29781
	N83-29782
NATO-292.81	N83-30249
NA81AA-D-00065	N83-29462
NA8011-D-00038	N83-29946
NB-79-SBCA-0088	N83-30088
NB81-SBCA-0735	N83-30049
NB82-SBCA-1533	N83-30046
NCA-2-OR745-702	N83-30123
NCA2-0R-850-001	N83-29771
NCC2-27	N83-30016
NGL-05-020-272	N83-30347
NGL-23-004-083	N83-29747
NGL-33-010-171	N83-29745
NGT-03-002-800	N83-29177
NIH-AI-08247	N83-29403
NIH-CA-27024-02	N83-29661
NIH-GM-10840	N83-29405
NR PROJ. 051-622	N83-30237
NR PROJ. 051-693	N83-30274
NR PROJ. 051-775	N83-29367

NR PROJ. 056-746 ..... N83-29696
NR PROJ. 056-749 ..... N83-29697
NR PROJ. 083-400 ..... N83-29956
NR PROJ. 097-395 ..... N83-29640
NR PROJ. 150-412 ..... N83-30012
NR PROJ. 170-926 ..... N83-30014
NR PROJ. 197-075 ..... N83-30001
NR PROJ. 379-053 ..... N83-29689
NR PROJ. 631-616 ..... N83-29328
NR PROJ. 633-846 ..... N83-29329
NSF CEE-79-06295 ..... N83-29476
NSF CEE-79-20311 ..... N83-29488
NSF CEE-81-07217 ..... N83-29465
NSF CHE-79-18073 ..... N83-30237
NSF CHE-80-22874 ..... N83-29697
NSF CHE-80-25633 ..... N83-30237
NSF CME-79-19836 ..... N83-30145
NSF CME-80-06711 ..... N83-29741
NSF CME-80-11115 ..... N83-29474
NSF DMR-76-80847 ..... N83-29364
NSF DPP-80-20384 ..... N83-29796
NSF ECS-79-07047 ..... N83-29613
NSF ECS-79-16453 ..... N83-30126
NSF ECS-79-19396 ..... N83-30118
N83-30119
NSF ECS-80-26777 ..... N83-30120
NSF ECS-81-02895 ..... N83-30089
NSF ECS-81-11218 ..... N83-30138
NSF ECS-81-15000 ..... N83-30159
NSF EMR-81-19500 ..... N83-29704
NSF ENV-77-07190 ..... N83-29464
NSF G5-105071 ..... N83-30145
NSF INT-83-1191 ..... N83-30320
NSF KE-80-01969 ..... N83-29367
NSF MCS-77-02082 ..... N83-30123
NSF MCS-80-11409 ..... N83-30075
NSF MCS-81-01892 ..... N83-30106
NSF MCS-81-05552 ..... N83-30117
NSF MCS-81-06181 ..... N83-30114
NSF PFR-78-02399 ..... N83-29474
NSF PFR-79-08984 ..... N83-29465
N83-29742
NSF PFR-80-02582 ..... N83-29464
NSF PFR-80-19826 ..... N83-29939
NSF PRA-82-12159 ..... N83-30304
NSF PRF-80-09478 ..... N83-29470
NSF PRM-80-11453-02 ..... N83-29539
N83-29540
NSG-1354 ..... N83-29271
NSG-1571 ..... N83-29315
NSG-3194 ..... N83-30328
NSG-7055 ..... N83-30348
NSG-7610 ..... N83-29893
N01-HV-2926-2 ..... N83-30007
N81-NADA-2041 ..... N83-29348
N00014-75-C-0348 ..... N83-30003
N00014-75-C-0673 ..... N83-30347
N00014-75-C-0694 ..... N83-29640
N00014-75-C-1132 ..... N83-30123
N00014-76-C-0182 ..... N83-29177
N00014-76-C-0197 ..... N83-29956
N00014-76-C-0276 ..... N83-30129
N00014-76-C-0475 ..... N83-30149
N00014-76-C-0606 ..... N83-30275
N00014-76-C-0617 ..... N83-29327
N00014-76-C-0638 ..... N83-30237
N00014-76-C-1105 ..... N83-29561
N00014-77-C-0306 ..... N83-30148
N00014-77-C-0376 ..... N83-29396
N00014-77-C-0378 ..... N83-30072
N00014-78-C-0025 ..... N83-30012
N00014-78-C-0035 ..... N83-30279
N00014-78-C-0388 ..... N83-29182
N00014-78-C-0518 ..... N83-30278
N00014-78-C-0592 ..... N83-30274
N00014-78-C-0723 ..... N83-30226
N00014-79-C-0128 ..... N83-30150
N00014-79-C-0131 ..... N83-29609
N00014-79-C-0276 ..... N83-29639
N00014-79-C-0323 ..... N83-30063
N00014-79-C-0340 ..... N83-30134
N00014-79-C-0415 ..... N83-30180
N00014-79-C-0424 ..... N83-29582
N83-29583
N83-29600
N83-29607
N83-29608
N83-30098
N83-30100
N83-30117
N83-30118
N83-30119
N83-30126
N83-30229
N00014-79-C-0665 ..... N83-30171
N83-30182
N00014-79-C-0976 ..... N83-30079
N00014-80-C-0076 ..... N83-30114
N00014-80-C-0116 ..... N83-29364
N00014-80-C-0262 ..... N83-29785
N00014-80-C-0440 ..... N83-29581
N00014-80-C-0472 ..... N83-29696
N83-29697
N00014-80-C-0750 ..... N83-30036
N00014-80-K-0709 ..... N83-30122
N83-30125
N00014-81-C-0208 ..... N83-30174
N00014-81-C-0236 ..... N83-30156
N83-30157
N00014-81-C-0449 ..... N83-29996
N00014-81-C-0776 ..... N83-29367
N00014-81-C-2038 ..... N83-29904
N00014-81-C-2148 ..... N83-30228
N00014-81-C-2254 ..... N83-29567
N00014-81-C-2560 ..... N83-29599
N00014-81-K-0014 ..... N83-30126
N00014-81-K-0039 ..... N83-29362
N00014-81-K-0197 ..... N83-30014
N00014-81-K-0255 ..... N83-30177
N00014-81-K-0605 ..... N83-29598
N00014-82-C-0060 ..... N83-29365
N00014-82-C-0067 ..... N83-30009
N00014-82-C-0163 ..... N83-29656
N00014-82-C-0697 ..... N83-30276
N00014-82-C-0726 ..... N83-30299
N00014-82-C-2201 ..... N83-30228
N00014-82-C-2257 ..... N83-29694
N00014-82-F-0123 ..... N83-29618
N00014-82-G-0103 ..... N83-30043
N00014-82-G-0111 ..... N83-30001
N00014-82-K-0109 ..... N83-29689
N00014-82-K-0184 ..... N83-30114
N00014-82-K-0200 ..... N83-29637
N00014-82-K-0295 ..... N83-30070
N83-30120
N83-30156
N00014-82-K-0322 ..... N83-29328
N00014-83-G-0010 ..... N83-29967
N00024-78-C-5384 ..... N83-30348
N00024-83-C-5301 ..... N83-29319
N83-29535
N83-30278
N00039-81-C-0408 ..... N83-29563
N00039-82-G-0250 ..... N83-30310
N00167-82-M-0636 ..... N83-30081
N00173-80-C-0424 ..... N83-30224
N00173-80-C-0425 ..... N83-29585
N00173-80-C-0485 ..... N83-29575
N00176-82-M-0743 ..... N83-30081
N00228-81-C-H156 ..... N83-29933
N62269-81-C-0717 ..... N83-29200
N68335-80-C-0529 ..... N83-29402
PROJ. AGRISTARS N83-29748
PUC-TELEBRAS-88/81 ..... N83-29524
RR0000110 ..... N83-30077
RR0110341 ..... N83-30082
RR0110842 ..... N83-29320
RR0110941 ..... N83-30179
RR0210542 ..... N83-29568
RR0420901 ..... N83-30036
RR0420902 ..... N83-30001
RR00001100 ..... N83-30124
RR04200401 ..... N83-30012
SAI PROJ. 1-157-13-705-00 ..... N83-29904
SF11121604 ..... N83-30130
SF43422593 ..... N83-29735
SRC-GR/B/77215 ..... N83-30102
SRC-N2B-2R-0338 ..... N83-29550
TRRL-90/1297 ..... N83-29990
N83-30015
W-31-109-ENG-38 ..... N83-29342
N83-29371
N83-29373
N83-29666
N83-29699
N83-29847
N83-29876
N83-30205
N83-30285
W-7405-ENG-26 ..... N83-29321
N83-29339
N83-29341
N83-29404
N83-29643
N83-29739
N83-29788
N83-29827
N83-30005
N83-30097
N83-30185
N83-30189
N83-30190
N83-30191
N83-30192
N83-30195
N83-30198
N83-30240
N83-30242
N83-30293
W-7405-ENG-36 ..... N83-29425
N83-29426
N83-29586
N83-29667
N83-29716
N83-29814
N83-29819
N83-29826
N83-29853
N83-29878
N83-30083
N83-30139
N83-30183
N83-30187
N83-30193
N83-30194
N83-30196
N83-30197
N83-30231
N83-30245
N83-30246
N83-30282
N83-30283
N83-30352
W-7405-ENG-38 ..... N83-29641
W-7405-ENG-48 ..... N83-29372
N83-29406
N83-29424
N83-29458
N83-29614
N83-29645
N83-29646
N83-29662
N83-29663
N83-29664
N83-29698
N83-29700
N83-29720
N83-29727
N83-29864
N83-29865
N83-29910
N83-29911
N83-29912
N83-30085
N83-30086
N83-30154
N83-30155
N83-30184
N83-30214
N83-30216
N83-30232
N83-30241
N83-30249
N83-30250
N83-30255
N83-30312
N83-30313
W-7405-ENG-82 ..... N83-29839
N83-30137
N83-30281
W-7705-ENG-48 ..... N83-30273
WF41460000 ..... N83-29402
WR0141108 ..... N83-29329
WR0130101 ..... N83-29329
WR02201001 ..... N83-29366
WR02302000 ..... N83-29200
WR04101001 ..... N83-30001
ZR01107 ..... N83-29683
ZR01109 ..... N83-29603
N83-29604
N83-29605
N83-30178
ZR0140201 ..... N83-30081
146-01-05-50-03 ..... N83-29746
147-10-03 ..... N83-29924
199-60-62 ..... N83-30016
505-07-31-07 ..... N83-29193
505-31-OA N83-29179
505-31-0 ..... N83-30113
505-31-11 ..... N83-29634
505-31-21-00-21 ..... N83-29636
505-31-33-13 ..... N83-30167
505-31-42 ..... N83-29237
N83-29359
505-31-53-07 ..... N83-29631
505-31-53-09 ..... N83-29655
505-31-53-10 ..... N83-29273
505-32-03-05 ..... N83-30164

505-32-33 ..... N83-29174
505-32-42 ..... N83-29710
N83-29711
N83-29712
N83-29713
505-33-1A N83-29358
505-33-22 ..... N83-29734
505-33-72 ..... N83-29731
505-40-5B N83-29597
505-40-6B N83-29235
505-40-22 ..... N83-29236
505-40-32 ..... N83-29178
505-42-21-06 ..... N83-29181
505-42-21-06-00 ..... N83-29180
505-45-02 ..... N83-30168
505-45-23 ..... N83-29733
506-51-11-04-00 ..... N83-29635
506-53-13 ..... N83-29311
506-62-23-01 ..... N83-29304
506-63-32-01 ..... N83-29278
532-06-11 ..... N83-30325
534-03-13 ..... N83-29732
643-10-01 ..... N83-29493
663-80-02 ..... N83-29771
776-72-41 ..... N83-29326
N83-29810
778-36-06 ..... N83-29811
917-60-00 ..... N83-29292
969-13-22 ..... N83-29923

REPORT / ACCESSION NUMBER INDEX

Typical Report / Accession Number Index Listing



Listings in this index are arranged alphanumerically by report number. The NASA accession number denotes the number by which the citation is identified. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche.

A-8955 ..... N83-29193* #
A-9055 ..... N83-30016* #
A-9093 ..... N83-29924* #
A-9263 ..... N83-29636* #
A-9359 ..... N83-29634* #
A-9369 ..... N83-29181* #
A-9394 ..... N83-29635* #
A-9399 ..... N83-29180* #

ACT-28 ..... N83-30117 #

AD-A112448 ..... N83-29950 #
AD-A123839 ..... N83-29994 #
AD-A124000 ..... N83-29998 #
AD-A124936 ..... N83-29997 #
AD-A124981 ..... N83-30134 #
AD-A125042 ..... N83-30347* #
AD-A125383 ..... N83-30348* #
AD-A125403 ..... N83-30002 #
AD-A125428 ..... N83-29201 #
AD-A125432 ..... N83-29691 #
AD-A125434 ..... N83-29330 #
AD-A125435 ..... N83-30001 #
AD-A125441 ..... N83-29573 #
AD-A125456 ..... N83-29692 #
AD-A125475 ..... N83-29657 #
AD-A125477 ..... N83-30078 #
AD-A125478 ..... N83-29970 #
AD-A125480 ..... N83-29693 #
AD-A125493 ..... N83-29575 #
AD-A125495 ..... N83-29309 #
AD-A125498 ..... N83-30302 #
AD-A125507 ..... N83-30040 #
AD-A125508 ..... N83-29903 #
AD-A125510 ..... N83-29576 #
AD-A125511 ..... N83-29319 #
AD-A125512 ..... N83-29402 #
AD-A125513 ..... N83-29785 #
AD-A125514 ..... N83-30013 #
AD-A125516 ..... N83-29688 #
AD-A125521 ..... N83-29609 #
AD-A125523 ..... N83-30039 #
AD-A125524 ..... N83-29572 #
AD-A125527 ..... N83-30077 #
AD-A125531 ..... N83-29367 #
AD-A125533 ..... N83-29194 #
AD-A125536 ..... N83-30181 #
AD-A125538 ..... N83-29689 #
AD-A125540 ..... N83-29968 #
AD-A125545 ..... N83-29969 #
AD-A125546 ..... N83-29195 #
AD-A125552 ..... N83-29736 #
AD-A125553 ..... N83-29935* #
AD-A125558 ..... N83-29690 #
AD-A125559 ..... N83-29954 #
AD-A125560 ..... N83-30127 #
AD-A125561 ..... N83-30115 #
AD-A125569UVA-525634/EE82/106 ..... N83-29562 #
AD-A125571 ..... N83-29369 #
AD-A125573 ..... N83-30116 #
AD-A125575 ..... N83-30223 #
AD-A125577 ..... N83-30009 #
AD-A125582 ..... N83-30298 #
AD-A125583 ..... N83-30129 #
AD-A125609 ..... N83-29599 #
AD-A125621 ..... N83-30272 #
AD-A125633 ..... N83-30012 #
AD-A125634 ..... N83-29637 #
AD-A125681 ..... N83-30011 #
AD-A125696 ..... N83-30000 #
AD-A125698 ..... N83-29361 #
AD-A125699 ..... N83-29999 #
AD-A125737 ..... N83-29956 #
AD-A125756 ..... N83-30014 #
AD-A125767 ..... N83-29558 #
AD-A125768 ..... N83-30148 #
AD-A125769 ..... N83-30114 #
AD-A125770 ..... N83-30149 #
AD-A125772 ..... N83-29559 #
AD-A125776 ..... N83-29560 #
AD-A125779 ..... N83-30150 #
AD-A125783 ..... N83-29598 #
AD-A125784 ..... N83-29316 #
AD-A125796 ..... N83-29561 #
AD-A125799 ..... N83-29967 #
AD-A125800 ..... N83-30063 #
AD-A125806 ..... N83-30036 #
AD-A125807 ..... N83-29395 #
AD-A125812 ..... N83-29585 #
AD-A125813 ..... N83-29670 #
AD-A125815 ..... N83-29928 #
AD-A125818 ..... N83-29396 #
AD-A125819 ..... N83-29205 #
AD-A125820 ..... N83-29450 #
AD-A125821 ..... N83-30003 #
AD-A125822 ..... N83-29581 #
AD-A125830 ..... N83-30064 #
AD-A125831 ..... N83-30065 #
AD-A125832 ..... N83-29317 #
AD-A125833 ..... N83-29454 #
AD-A125835 ..... N83-30117 #
AD-A125836 ..... N83-29600 #
AD-A125841 ..... N83-29299 #
AD-A125845 ..... N83-30118 #
AD-A125846 ..... N83-29300 #
AD-A125847 ..... N83-30004 #
AD-A125852 ..... N83-30119 #
AD-A125853 ..... N83-30098 #
AD-A125854 ..... N83-29929 #
AD-A125856 ..... N83-30274 #
AD-A125857 ..... N83-29399 #
AD-A125858 ..... N83-30275 #
AD-A125869 ..... N83-29897 #
AD-A125870 ..... N83-30175 #
AD-A125871 ..... N83-30229 #
AD-A125872 ..... N83-29582 #
AD-A125873 ..... N83-29726 #
AD-A125875 ..... N83-29320 #
AD-A125876 ..... N83-30130 #
AD-A125877 ..... N83-29583 #
AD-A125882 ..... N83-29182 #
AD-A125897 ..... N83-30131 #
AD-A125898 ..... N83-30132 #
AD-A125900 ..... N83-29906 #
AD-A125901 ..... N83-29640 #
AD-A125902 ..... N83-30133 #
AD-A125908 ..... N83-30100 #
AD-A125927 ..... N83-29368 #
AD-A125931 ..... N83-30126 #
AD-A125932 ..... N83-30301 #
AD-A125934 ..... N83-30075 #
AD-A125935 ..... N83-30044 #
AD-A125940 ..... N83-29685 #
AD-A125941 ..... N83-29607 #
AD-A125942 ..... N83-29608 #
AD-A125953 ..... N83-30161 #
AD-A125959 ..... N83-29563 #
AD-A125964 ..... N83-29327 #
AD-A125967 ..... N83-29397 #
AD-A125968 ..... N83-29398 #
AD-A125976 ..... N83-30273 #
AD-A125978 ..... N83-29199 #
AD-A125983 ..... N83-30307 #
AD-A125984 ..... N83-30308 #
AD-A125985 ..... N83-29957 #
AD-A125997 ..... N83-30174 #
AD-A126000 ..... N83-29951 #
AD-A126001 ..... N83-29895 #
AD-A126002 ..... N83-29896 #
AD-A126003 ..... N83-30096 #
AD-A126007 ..... N83-29934 #
AD-A126010 ..... N83-30226 #
AD-A126021 ..... N83-30099 #
AD-A126022 ..... N83-29686 #
AD-A126023 ..... N83-29687 #
AD-A126026 ..... N83-30076 #
AD-A126031 ..... N83-29569 #
AD-A126036 ..... N83-30038 #
AD-A126038 ..... N83-29571 #
AD-A126044 ..... N83-30279 #
AD-A126047 ..... N83-30180 #
AD-A126048 ..... N83-29318 #
AD-A126053 ..... N83-29307 #
AD-A126054 ..... N83-29451 #
AD-A126055 ..... N83-30073 #
AD-A126056 ..... N83-29363 #
AD-A126057 ..... N83-30353 #
AD-A126058 ..... N83-29364 #
AD-A126059 ..... N83-29639 #
AD-A126060 ..... N83-29238 #
AD-A126062 ..... N83-29899 #
AD-A126065 ..... N83-30072 #
AD-A126068 ..... N83-30224 #
AD-A126070 ..... N83-29365 #
AD-A126071 ..... N83-29567 #
AD-A126075 ..... N83-30225 #
AD-A126076 ..... N83-29416 #
AD-A126079 ..... N83-30122 #
AD-A126081 ..... N83-29971 #
AD-A126082 ..... N83-30123* #
AD-A126083 ..... N83-29296 #
AD-A126086 ..... N83-30124 #
AD-A126087 ..... N83-30309 #
AD-A126091 ..... N83-30177 #
AD-A126094 ..... N83-29328 #
AD-A126095 ..... N83-29930 #
AD-A126096 ..... N83-29931 #
AD-A126097 ..... N83-29932 #
AD-A126098 ..... N83-29683 #
AD-A126100 ..... N83-29366 #
AD-A126101 ..... N83-30158 #
AD-A126102 ..... N83-29400 #
AD-A126104 ..... N83-30152 #
AD-A126109 ..... N83-29568 #
AD-A126113 ..... N83-29900 #
AD-A126114 ..... N83-29603 #
AD-A126115 ..... N83-29604 #
AD-A126116 ..... N83-29605 #
AD-A126117 ..... N83-30178 #
AD-A126118 ..... N83-29714 #
AD-A126119 ..... N83-29329 #
AD-A126130 ..... N83-29415 #
AD-A126131 ..... N83-29565 #
AD-A126132 ..... N83-29206 #
AD-A126133 ..... N83-29656 #
AD-A126140 ..... N83-29602 #
AD-A126146 ..... N83-30071 #
AD-A126155 ..... N83-29638 #
AD-A126156 ..... N83-30277 #
AD-A126158 ..... N83-29566 #
AD-A126159 ..... N83-29279 #
AD-A126161 ..... N83-30330 #
AD-A126163 ..... N83-29362 #
AD-A126165 ..... N83-30230 #
AD-A126168 ..... N83-29584 #
AD-A126169 ..... N83-29612 #
AD-A126171 ..... N83-30082 #
AD-A126179 ..... N83-30238 #
AD-A126182 ..... N83-29239 #
AD-A126183 ..... N83-30162 #
AD-A126185 ..... N83-30182* #
AD-A126188 ..... N83-29695 #
AD-A126190 ..... N83-30079 #
AD-A126198 ..... N83-30310 #
AD-A126199 ..... N83-29190 #
AD-A126201 ..... N83-29696 #
AD-A126202 ..... N83-29697 #

AD-A126204 N83-30171* #
AD-A126207 N83-30227 #
AD-A126208 N83-29577 #
AD-A126209 N83-29291 #
AD-A126212 N83-29574 #
AD-A126213 N83-29610 #
AD-A126214 N83-29578 #
AD-A126215 N83-29955 #
AD-A126216 N83-29611 #
AD-A126217 N83-29579 #
AD-A126219 N83-29417 #
AD-A126220 N83-30010 #
AD-A126221 N83-29601 #
AD-A126222 N83-29694 #
AD-A126223 N83-30043 #
AD-A126228 N83-30067 #
AD-A126230 N83-30151 #
AD-A126232 N83-30237 #
AD-A126234 N83-30068 #
AD-A126235 N83-30069 #
AD-A126237 N83-30120 #
AD-A126238 N83-30156 #
AD-A126239 N83-30157 #
AD-A126240 N83-30070 #
AD-A126241 N83-30299 #
AD-A126242 N83-30276 #
AD-A126245 N83-29933 #
AD-A126249 N83-29898 #
AD-A126252 N83-29952 #
AD-A126261 N83-29200 #
AD-A126263 N83-30121 #
AD-A126264 N83-29682 #
AD-A126268 N83-30176 #
AD-A126271 N83-30066 #
AD-A126272 N83-29274 #
AD-A126275 N83-29564 #
AD-A126277 N83-29295 #
AD-A126280 N83-29995 #
AD-A126284 N83-29996 #
AD-A126285 N83-29735 #
AD-A126286 N83-30179 #
AD-A126289 N83-29902 #
AD-A126290 N83-30300 #
AD-A126291 N83-29171 #
AD-A126295 N83-30278 #
AD-A126296 N83-30037 #
AD-A126298 N83-29570 #
AD-A126300 N83-29401 #
AD-A126306 N83-29684 #
AD-A126307 N83-30074 #
AD-A126309 N83-30125 #
AD-A126310 N83-29784 #
AD-A126314 N83-29452 #
AD-A126315 N83-29453 #
AD-A126317 N83-29275 #
AD-A126318 N83-29901 #
AD-A126319 N83-29606 #
AD-A126320 N83-29658 #
AD-A126322 N83-30163 #
AD-A126323 N83-30349 #
AD-A126325 N83-30228 #
AD-A126327 N83-30080 #
AD-A126330 N83-29455 #
AD-A126331 N83-29953 #
AD-A126332 N83-29905 #
AD-A126333 N83-29580 #
AD-A126336 N83-30153 #
AD-A126339 N83-29936 #
AD-A126340 N83-30128 #
AD-A126341 N83-29904 #
AD-A126343 N83-29618 #
AD-A127737 N83-30081 #
AD-A127752 N83-29403 #

AD-E000532 N83-29400 #
AD-E000533 N83-29568 #
AD-E301079 N83-30238 #
AD-E302080 N83-29900 #
AD-E400974 N83-30078 #
AD-E400978 N83-29415 #
AD-E410654 N83-29693 #
AD-E950363 N83-29565 #

AD-F300210 N83-30152 #
AD-F500132 N83-29657 #
AD-F500141 N83-30178 #
AD-F500142 N83-29603 #
AD-F500143 N83-29604 #
AD-F500147 N83-29605 #

AE-8223 N83-29449 #

AEDC-TSR-82-P39 N83-29572 #

AES-14001 N83-30163 #

AF-83-048 N83-30171* #

AFAMRL-TR-81-103 N83-29190 #
AFAMRL-TR-81-153 N83-29969 #
AFAMRL-TR-83-0005 N83-29968 #

AFATL-TR-82-40 N83-29970 #

AFFSC/ESL-TR-82-45 N83-29870 #

AFGL-TR-81-0085 N83-30065 #
AFGL-TR-82-0291 N83-29929 #
AFGL-TR-82-0299 N83-30349 #
AFGL-TR-82-0313 N83-30175 #
AFGL-TR-82-0324 N83-30064 #
AFGL-TR-82-0335 N83-29936 #
AFGL-TR-82-0348 N83-29682 #
AFGL-TR-82-0363 N83-29299 #
AFGL-TR-82-0373 N83-29901 #
AFGL-TR-82-0386 N83-30121 #
AFGL-TR-82-0387 N83-29902 #
AFGL-TR-82-0395 N83-29454 #
AFGL-TR-83-0003 N83-29897 #
AFGL-TR-83-0021 N83-29905 #
AFGL-TR-83-0026 N83-29953 #
AFGL-TR-83-0039 N83-29300 #
AFGL-TR-83-0040 N83-30153 #
AFGL-TR-83-0049 N83-30348* #

AFHRL-TP-82-37 N83-30151 #
AFHRL-TP-82-44 N83-30067 #

AFIT/DS/PH/82-2 N83-29330 #

AFIT/GE/EE/82D-28 N83-29569 #

AFOSR-83-0009TR N83-29688 #
AFOSR-83-0050TR N83-30000 #
AFOSR-83-0051TR N83-29999 #
AFOSR-83-0054TR N83-29690 #
AFOSR-83-0059TR N83-29369 #
AFOSR-83-0062TR N83-30011 #
AFOSR-83-0069TR N83-30116 #
AFOSR-83-0073TR N83-30298 #
AFOSR-83-0078TR N83-30115 #
AFOSR-83-0079TR N83-30127 #
AFOSR-83-0104TR N83-30272 #
AFOSR-83-0107TR N83-29361 #
AFOSR-83-0109TR N83-29562 #
AFOSR-83-0366TR N83-29403 #

AFRPL-TR-82-004 N83-29309 #
AFRPL-TR-82-094 N83-29309 #

AFWAL-TR-82-91 N83-30273 #
AFWAL-TR-82-1159 N83-30277 #
AFWAL-TR-82-2086 N83-30163 #
AFWAL-TR-82-3054 N83-29275 #
AFWAL-TR-82-4085 N83-29317 #
AFWAL-TR-82-4094 N83-29318 #
AFWAL-TR-82-4155 N83-29726 #
AFWAL-TR-83-1035 N83-30080 #

AGARD-AG-279 N83-29276 #

AGARD-AR-190 N83-29277 #

AGARD-CP-324 N83-29241 #
AGARD-CP-335 N83-29277 #

AI/DS-TR-3006-1 N83-30071 #

AIAA-83-1340 N83-29235* #

ALO-5366-4 N83-29841 #

AMMRC-TR-82-52 N83-29171 #
AMMRC-TR-83-5 N83-29399 #

ANL/EIS-14 N83-29876 #

ANTART-BIB-I-27522 N83-29796 #

APR-1 N83-29689 #

AP83-057 N83-30182* #

AR-1 N83-30000 #
AR-3 N83-30011 #

ARBRL-TR-02477 N83-30152 #

ARCSL-CR-82037 N83-29558 #
ARCSL-CR-82060 N83-29693 #

ARCSL-SP-83007 N83-29274 #

ARI-RR-320 N83-29606 #

ARLCB-TR-83003 N83-29736 #

ARLCD-TR-83005 N83-29415 #

ARO-16062.3-MS N83-29398 #
ARO-16370.10-MS N83-29316 #
ARO-16373.4-MA N83-30133 #
ARO-16513.6-PH N83-29685 #
ARO-16561.6-MA N83-30131 #
ARO-16740.11-MS N83-29368 #
ARO-16746.7-CH N83-29397 #
ARO-16952.4-MA N83-30132 #
ARO-18671.2-PH N83-29559 #

ARPAD-CR-83022 N83-30078 #

AVSD-0350-81-RR N83-29865 #

B-209125 N83-29202 #

BBN-5101 N83-30036 #
BBN-5242 N83-30072 #

BM-IC-8897 N83-29385 #

BM-RI-8702 N83-29799 #
BM-RI-8714 N83-29379 #
BM-RI-8720 N83-29381 #
BM-RI-8724 N83-29382 #
BM-RI-8732 N83-29410 #
BM-RI-8733 N83-29383 #

BMFT-FB-ID-83-003 N83-30314 #

BMFT-FB-T-80-103 N83-29674 #
BMFT-FB-T-82-241 N83-29374 #
BMFT-FB-T-83-06 N83-30291 #
BMFT-FB-T-83-004 N83-30286 #
BMFT-FB-T-83-005 N83-29619 #
BMFT-FB-T-83-015 N83-30287 #
BMFT-FB-T-83-018 N83-29620 #
BMFT-FB-T-83-021 N83-29240 #
BMFT-FB-T-83-022 N83-29621 #
BMFT-FB-T-83-024 N83-29376 #
BMFT-FB-T-83-025 N83-29407 #
BMFT-FB-T-83-026 N83-29408 #
BMFT-FB-T-83-027 N83-29868 #
BMFT-FB-T-83-028 N83-29377 #
BMFT-FB-T-83-030 N83-29347 #
BMFT-FB-T-83-032 N83-30288 #
BMFT-FB-T-83-033 N83-29869 #
BMFT-FB-T-83-034 N83-29375 #
BMFT-FB-T-83-037 N83-29459 #
BMFT-FB-T-83-041 N83-30256 #
BMFT-FB-T-83-047 N83-30289 #
BMFT-FB-T-83-049 N83-30290 #
BMFT-FB-T-83-052 N83-29622 #
BMFT-FB-T-83-059 N83-29623 #

BMFT-FB-W-83-001 N83-29648 #
BMFT-FB-W-83-002 N83-29649 #
BMFT-FB-W-83-003 N83-29301 #
BMFT-FB-W-83-004 N83-29184 #

BNL-NUREG-51629 N83-29740 #

BNL-31423 N83-30294 #
BNL-32044 N83-30087 #
BNL-32266 N83-30006 #
BNL-32367 N83-29874 #
BNL-32368 N83-29872 #
BNL-51624 N83-29336 #

BR87061 N83-29988

CA-8207 N83-29632 #
CA-8215 N83-29394 #
CA-8229 N83-29633 #

CCA-81-10 N83-30088 #

CCS-413 N83-30120 #
CCS-437 N83-30156 #
CCS-441 N83-30157 #
CCS-450 N83-30070 #

CCTC-CSM-UM-246-82-CHG-4 N83-30068 #
CCTC-CSM-UM-246-82-CHG-5 N83-30069 #

CECOM-81-C-0085-2 N83-30225 #

CELSS-19 N83-30016* #

CERN-EP-81-81 N83-30186 #

CIS-14 ..... N83-30009 #

CMU-CS-82-136 ..... N83-30044 #
CMU-CS-82-148 ..... N83-30075 #
CMU-CS-82-152 ..... N83-30096 #
CMU-CS-82-153 ..... N83-30076 #

CONF-810510-3 ..... N83-29860 #
CONF-820107-7 ..... N83-29615 #
CONF-820142-1 ..... N83-30188 #
CONF-820150-1 ..... N83-30283 #
CONF-820336-5 ..... N83-30183 #
CONF-820372-1 ..... N83-29853 #
CONF-820381-2 ..... N83-29341 #
CONF-820382-1 ..... N83-30196 #
CONF-820422-3 ..... N83-29864 #
CONF-820428-1 ..... N83-30231 #
CONF-820428-2 ..... N83-30194 #
CONF-820429-2 ..... N83-30244 #
CONF-820429-3 ..... N83-30245 #
CONF-820429-5 ..... N83-30196 #
CONF-820429-6 ..... N83-30197 #
CONF-820440-4 ..... N83-30189 #
CONF-820457-1 ..... N83-30232 #
CONF-820470-2 ..... N83-30294 #
CONF-820542-1 ..... N83-29862 #
CONF-820544-2 ..... N83-29717 #
CONF-820545-16 ..... N83-29338 #
CONF-820545-22 ..... N83-29373 #
CONF-820553-2 ..... N83-30249 #
CONF-820570-3 ..... N83-29858 #
CONF-820575-5 ..... N83-30185 #
CONF-820582-1 ..... N83-30352 #
CONF-820604-3 ..... N83-29823 #
CONF-820605-8 ..... N83-29716 #
CONF-820605-9 ..... N83-29819 #
CONF-820618-8 ..... N83-30254 #
CONF-820618-9 ..... N83-30252 #
CONF-820618-10 ..... N83-30253 #
CONF-820621-2 ..... N83-29817 #
CONF-820624-3 ..... N83-30005 #
CONF-820629-3 ..... N83-29826 #
CONF-820636-2 ..... N83-30214 #
CONF-820642-2 ..... N83-29406 #
CONF-820644-1 ..... N83-30246 #
CONF-820657-1 ..... N83-30191 #
CONF-820658-1 ..... N83-30192 #
CONF-820663-1 ..... N83-30195 #
CONF-820664-12 ..... N83-29641 #
CONF-820668-2 ..... N83-30154 #
CONF-820694-1 ..... N83-29642 #
CONF-820694-2 ..... N83-30243 #
CONF-820708-5 ..... N83-29616 #
CONF-820708-7 ..... N83-29866 #
CONF-820709-3 ..... N83-30204 #
CONF-820710-1 ..... N83-29340 #
CONF-820710-2 ..... N83-29429 #
CONF-820710-3 ..... N83-29428 #
CONF-820710-5 ..... N83-29430 #
CONF-820710-7 ..... N83-29427 #
CONF-820718-27 ..... N83-30203 #
CONF-820724-4 ..... N83-29370 #
CONF-820731-2 ..... N83-30201 #
CONF-820768-1 ..... N83-30084 #
CONF-820801-1 ..... N83-29425 #
CONF-820801-2 ..... N83-29426 #
CONF-820803-2 ..... N83-29910 #
CONF-820803-9 ..... N83-29912 #
CONF-820803-10 ..... N83-29911 #
CONF-820814-6 ..... N83-29861 #
CONF-820814-20 ..... N83-30250 #
CONF-820814-41 ..... N83-29847 #
CONF-820822-6 ..... N83-30086 #
CONF-820824-3 ..... N83-29659 #
CONF-820824-7-REV-1 ..... N83-29662 #
CONF-820824-9 ..... N83-29663 #
CONF-820828-8 ..... N83-30205 #
CONF-820909-3 ..... N83-29337 #
CONF-820920-1 ..... N83-29665 #
CONF-820922-1 ..... N83-29858 #
CONF-820941-12 ..... N83-30295 #
CONF-821011-45 ..... N83-29661 #
CONF-821012-4 ..... N83-30087 #
CONF-821106-27 ..... N83-30101 #
CONF-821128-4 ..... N83-30241 #
CONF-821136-13 ..... N83-29872 #
CONF-821136-14 ..... N83-29874 #
CONF-821136-17 ..... N83-29873 #
CONF-821166-1 ..... N83-30155 #
CONF-821214-4 ..... N83-29913 #
CONF-821215-13 ..... N83-29879 #
CONF-821227-1 ..... N83-30285 #
CONF-830109-2 ..... N83-29698 #
CONF-830114-3 ..... N83-29432 #
CONF-830204-4 ..... N83-29667 #
CONF-830210-15 ..... N83-29613 #

CONF-830320-1 ..... N83-30139 #
CONF-830323-1 ..... N83-29332 #
CONF-830417-1 ..... N83-29720 #
CONF-830418-1 ..... N83-29371 #
CONF-830663-3 ..... N83-30190 #
CONF-8105114-3 ..... N83-30186 #
CONF-8109121-1 ..... N83-30282 #
CONF-8205102-2 ..... N83-30184 #
CONF-8205177-1 ..... N83-29699 #
CONF-8206118-10 ..... N83-29666 #
CONF-8206163-1 ..... N83-29342 #
CONF-8206174-1 ..... N83-29839 #
CONF-8208109-2 ..... N83-29907 #
CONF-8209123-1 ..... N83-29646 #
CONF-8210100-2 ..... N83-29312 #
CONF-8210106-3 ..... N83-30006 #
CONF-8210134-1 ..... N83-30137 #

CONTRIB-468 ..... N83-29889 #
CONTRIB-3909 ..... N83-29893* #

COO-2383-0084 ..... N83-30130 #
COO-3117-25 ..... N83-29345 #

CP-22 ..... N83-29907 #

CPL82-2 ..... N83-29999 #

CRINC/RSL-TR-331-24 ..... N83-29561 #

CRREL-83-1 ..... N83-29455 #

CSC/TM-81/6238 ..... N83-29776* #

DA-TM-5-809-3 ..... N83-29452 #

DC-40 ..... N83-30118 #
DC-44 ..... N83-30119 #
DC-56 ..... N83-30098 #
DC-58 ..... N83-30100 #

DCIEM-82-R-54 ..... N83-30038 #

DE82-004368 ..... N83-29425 #
DE82-006145 ..... N83-29426 #
DE82-006769 ..... N83-29823 #
DE82-008109 ..... N83-30282 #
DE82-008113 ..... N83-29716 #
DE82-008115 ..... N83-29819 #
DE82-008314 ..... N83-29822 #
DE82-009026 ..... N83-29817 #
DE82-009519 ..... N83-30188 #
DE82-009598 ..... N83-29418 #
DE82-010083 ..... N83-29860 #
DE82-010896 ..... N83-29615 #
DE82-011582 ..... N83-30199 #
DE82-012136 ..... N83-30231 #
DE82-012139 ..... N83-29826 #
DE82-012147 ..... N83-30183 #
DE82-012337 ..... N83-29456 #
DE82-012694 ..... N83-29617 #
DE82-012699 ..... N83-29910 #
DE82-012776 ..... N83-29337 #
DE82-012837 ..... N83-29664 #
DE82-013402 ..... N83-30214 #
DE82-013458 ..... N83-30189 #
DE82-013637 ..... N83-29429 #
DE82-013642 ..... N83-29862 #
DE82-013653 ..... N83-29340 #
DE82-013811 ..... N83-30169 #
DE82-013888 ..... N83-29856 #
DE82-014040 ..... N83-30194 #
DE82-014043 ..... N83-30197 #
DE82-014044 ..... N83-30245 #
DE82-014046 ..... N83-30196 #
DE82-014083 ..... N83-30244 #
DE82-014100 ..... N83-29428 #
DE82-014138 ..... N83-29865 #
DE82-014207 ..... N83-29867 #
DE82-014558 ..... N83-29911 #
DE82-014693 ..... N83-29430 #
DE82-014879 ..... N83-29824 #
DE82-014898 ..... N83-29816 #
DE82-014899 ..... N83-29815 #
DE82-015165 ..... N83-30249 #
DE82-015176 ..... N83-29863 #
DE82-015189 ..... N83-29406 #
DE82-015196 ..... N83-29457 #
DE82-015236 ..... N83-29339 #
DE82-015256 ..... N83-29427 #
DE82-015258 ..... N83-29861 #
DE82-015418 ..... N83-30232 #
DE82-015443 ..... N83-30216 #
DE82-015514 ..... N83-30233 #
DE82-015729 ..... N83-29853 #
DE82-015740 ..... N83-30246 #

DE82-015744 ..... N83-30283 #
DE82-015748 ..... N83-30185 #
DE82-015804 ..... N83-30352 #
DE82-016008 ..... N83-29912 #
DE82-016134 ..... N83-29700 #
DE82-016296 ..... N83-29331 #
DE82-016325 ..... N83-29876 #
DE82-016360 ..... N83-30313 #
DE82-016660 ..... N83-29614 #
DE82-016808 ..... N83-29665 #
DE82-016978 ..... N83-29875 #
DE82-017072 ..... N83-29858 #
DE82-017163 ..... N83-30215 #
DE82-017188 ..... N83-30252 #
DE82-017202 ..... N83-29642 #
DE82-017213 ..... N83-30254 #
DE82-017216 ..... N83-30243 #
DE82-017229 ..... N83-29937 #
DE82-017269 ..... N83-29717 #
DE82-017287 ..... N83-29814 #
DE82-017303 ..... N83-30192 #
DE82-017305 ..... N83-30191 #
DE82-017316 ..... N83-30195 #
DE82-017425 ..... N83-30190 #
DE82-017430 ..... N83-30005 #
DE82-017517 ..... N83-30198 #
DE82-017518 ..... N83-29341 #
DE82-017575 ..... N83-29338 #
DE82-017621 ..... N83-29659 #
DE82-017635 ..... N83-30154 #
DE82-017638 ..... N83-30294 #
DE82-018077 ..... N83-29458 #
DE82-018210 ..... N83-29321 #
DE82-018292 ..... N83-29866 #
DE82-018309 ..... N83-29644 #
DE82-018313 ..... N83-29645 #
DE82-018393 ..... N83-29662 #
DE82-018508 ..... N83-29646 #
DE82-018521 ..... N83-30184 #
DE82-018589 ..... N83-29956 #
DE82-018600 ..... N83-29871 #
DE82-018633 ..... N83-29821 #
DE82-018772 ..... N83-29616 #
DE82-018803 ..... N83-30248 #
DE82-018814 ..... N83-30280 #
DE82-018820 ..... N83-29737 #
DE82-019029 ..... N83-29855 #
DE82-019030 ..... N83-29854 #
DE82-019065 ..... N83-29663 #
DE82-019169 ..... N83-29370 #
DE82-019182 ..... N83-30193 #
DE82-019191 ..... N83-30187 #
DE82-019194 ..... N83-30253 #
DE82-019229 ..... N83-30085 #
DE82-019245 ..... N83-30250 #
DE82-019251 ..... N83-30247 #
DE82-019312 ..... N83-30086 #
DE82-019412 ..... N83-29909 #
DE82-019513 ..... N83-29859 #
DE82-019748 ..... N83-30200 #
DE82-019791 ..... N83-29857 #
DE82-019808 ..... N83-29719 #
DE82-019816 ..... N83-29908 #
DE82-019824 ..... N83-29852 #
DE82-019875 ..... N83-29851 #
DE82-019879 ..... N83-30312 #
DE82-019881 ..... N83-29864 #
DE82-019894 ..... N83-29643 #
DE82-020341 ..... N83-30239 #
DE82-903207 ..... N83-30186 #
DE82-903277 ..... N83-29818 #
DE82-904018 ..... N83-29825 #
DE82-905768 ..... N83-29820 #
DE83-001219 ..... N83-29790 #
DE83-003221 ..... N83-29786 #
DE83-004259 ..... N83-30135 #
DE83-004314 ..... N83-29660 #
DE83-004479 ..... N83-30083 #
DE83-004857 ..... N83-29434 #
DE83-004863 ..... N83-30281 #
DE83-005012 ..... N83-29419 #
DE83-005216 ..... N83-29424 #
DE83-005285 ..... N83-29832 #
DE83-005333 ..... N83-29787 #
DE83-005407 ..... N83-29829 #
DE83-005551 ..... N83-29673 #
DE83-005558 ..... N83-29432 #
DE83-005583 ..... N83-29879 #
DE83-005584 ..... N83-29913 #
DE83-005630 ..... N83-29786 #
DE83-005752 ..... N83-29828 #
DE83-005866 ..... N83-29661 #
DE83-005870 ..... N83-29907 #
DE83-005911 ..... N83-29674 #
DE83-005912 ..... N83-29672 #
DE83-005947 ..... N83-29336 #

DE83-006026 ..... N83-29833 #
DE83-006029 ..... N83-29830 #
DE83-006033 ..... N83-29880 #
DE83-006123 ..... N83-29727 #
DE83-006146 ..... N83-30084 #
DE83-006235 ..... N83-30218 #
DE83-006359 ..... N83-30240 #
DE83-006360 ..... N83-29404 #
DE83-006412 ..... N83-30140 #
DE83-006415 ..... N83-29834 #
DE83-006471 ..... N83-29789 #
DE83-006488 ..... N83-29831 #
DE83-006516 ..... N83-29738 #
DE83-006533 ..... N83-30311 #
DE83-006554 ..... N83-29696 #
DE83-006569 ..... N83-30241 #
DE83-006570 ..... N83-30155 #
DE83-006574 ..... N83-29718 #
DE83-006579 ..... N83-29335 #
DE83-006596 ..... N83-30284 #
DE83-006645 ..... N83-30295 #
DE83-006648 ..... N83-29344 #
DE83-006664 ..... N83-29835 #
DE83-006685 ..... N83-30087 #
DE83-006721 ..... N83-29849 #
DE83-006748 ..... N83-29848 #
DE83-006812 ..... N83-29850 #
DE83-006819 ..... N83-29345 #
DE83-006846 ..... N83-30136 #
DE83-006912 ..... N83-29343 #
DE83-006939 ..... N83-29312 #
DE83-006966 ..... N83-30201 #
DE83-007012 ..... N83-30203 #
DE83-007022 ..... N83-29405 #
DE83-007062 ..... N83-30204 #
DE83-007081 ..... N83-29739 #
DE83-007126 ..... N83-29586 #
DE83-007168 ..... N83-30293 #
DE83-007171 ..... N83-29827 #
DE83-007251 ..... N83-30160 #
DE83-007272 ..... N83-29346 #
DE83-007320 ..... N83-30101 #
DE83-007359 ..... N83-29720 #
DE83-007388 ..... N83-30006 #
DE83-007417 ..... N83-29740 #
DE83-007427 ..... N83-29310 #
DE83-007436 ..... N83-29435 #
DE83-007443 ..... N83-29431 #
DE83-007450 ..... N83-29433 #
DE83-007462 ..... N83-29372 #
DE83-007565 ..... N83-30139 #
DE83-007575 ..... N83-29667 #
DE83-007587 ..... N83-30217 #
DE83-007611 ..... N83-29666 #
DE83-007683 ..... N83-29373 #
DE83-007789 ..... N83-30285 #
DE83-007815 ..... N83-29371 #
DE83-007863 ..... N83-29342 #
DE83-007905 ..... N83-30202 #
DE83-007945 ..... N83-30205 #
DE83-007949 ..... N83-29972 #
DE83-008167 ..... N83-30097 #
DE83-008173 ..... N83-30219 #
DE83-008277 ..... N83-29878 #
DE83-008323 ..... N83-29914 #
DE83-008428 ..... N83-30255 #
DE83-008484 ..... N83-29840 #
DE83-008499 ..... N83-30251 #
DE83-008670 ..... N83-29847 #
DE83-008771 ..... N83-29877 #
DE83-008942 ..... N83-29699 #
DE83-009064 ..... N83-30137 #
DE83-009066 ..... N83-29839 #
DE83-009089 ..... N83-29641 #
DE83-009093 ..... N83-29334 #
DE83-009124 ..... N83-29332 #
DE83-009141 ..... N83-29846 #
DE83-009665 ..... N83-29423 #
DE83-009667 ..... N83-29421 #
DE83-009668 ..... N83-29422 #
DE83-009725 ..... N83-29333 #
DE83-009737 ..... N83-29843 #
DE83-009763 ..... N83-29845 #
DE83-009816 ..... N83-29836 #
DE83-009863 ..... N83-29841 #
DE83-009985 ..... N83-29420 #
DE83-010232 ..... N83-29842 #
DE83-010250 ..... N83-29613 #
DE83-010293 ..... N83-29838 #
DE83-010298 ..... N83-29837 #
DE83-010390 ..... N83-29844 #
DE83-010458 ..... N83-30242 #
DE83-901452 ..... N83-29715 #
DE83-901484 ..... N83-29668 #

DFVLR-FB-82-28 ..... N83-29915 #
DFVLR-FB-83-05 ..... N83-29196 #

DL/NUC-R-21 ..... N83-30210 #

DNA-6103F ..... N83-29900 #
DNA-6152F ..... N83-30238 #

DOE/CS-31591/T8 ..... N83-29829 #
DOE/CS-32117/2 ..... N83-29840 #
DOE/CS-40071/21 ..... N83-29822 #

DOE/DP-40166/1 ..... N83-30202 #

DOE/EIA-0233(81/2) ..... N83-30311 #
DOE/EIA-0280(80) ..... N83-29789 #

DOE/EP-12079/T4 ..... N83-29877 #

DOE/ER-0344/91 ..... N83-30199 #
DOE/ER-03117/25 ..... N83-29345 #
DOE/ER-05002/26 ..... N83-30280 #
DOE/ER-10556/88 ..... N83-29737 #
DOE/ER-10645/9 ..... N83-30101 #
DOE/ER-10651/T1-VOL-2 ..... N83-30160 #
DOE/ER-10677/5 ..... N83-29334 #
DOE/ER-10902/2 ..... N83-29972 #
DOE/ER-12408/8 ..... N83-29738 #

DOE/ET-14858/T2 ..... N83-29434 #
DOE/ET-14881/9 ..... N83-29331 #
DOE/ET-15419/T2 ..... N83-30284 #
DOE/ET-17005/3 ..... N83-29718 #
DOE/ET-20255/T1 ..... N83-29832 #
DOE/ET-27204/T1-VOL-2-SECT-2 ..... N83-29786 #
DOE/ET-28365/27 ..... N83-29836 #
DOE/ET-28393/T1 ..... N83-29790 #
DOE/ET-29138/T1 ..... N83-30140 #
DOE/ET-41900/17 ..... N83-30218 #
DOE/ET-51013/39 ..... N83-30247 #
DOE/ET-51013/73 ..... N83-29613 #
DOE/ET-53047/T1 ..... N83-30239 #
DOE/ET-53088/62 ..... N83-30253 #

DOE/EV-10021/T1 ..... N83-29937 #
DOE/EV-10328/3 ..... N83-29875 #
DOE/EV-10453/T2 ..... N83-29871 #

DOE/IA-0010/18 ..... N83-29824 #

DOE/ID-12320/T1 ..... N83-29333 #
DOE/ID-12321/T1 ..... N83-29423 #
DOE/ID-12322/T1 ..... N83-29422 #
DOE/ID-12324/T1 ..... N83-29419 #
DOE/ID-12346/T1 ..... N83-29421 #

DOE/JPL-1012-87 ..... N83-29809* #

DOE/LC-10335/T1 ..... N83-29848 #

DOE/LLW-16T ..... N83-30219 #

DOE/NASA/0002-1 ..... N83-29812* #
DOE/NASA/0219-1 ..... N83-30297* #
DOE/NASA/0287-1 ..... N83-29359* #
DOE/NASA/3194-1 ..... N83-30328* #
DOE/NASA/12726-20 ..... N83-29326* #
DOE/NASA/12726-22 ..... N83-29810* #
DOE/NASA/20320-46 ..... N83-29813* #
DOE/NASA/51044-30 ..... N83-29811* #

DOE/NBM-2017287 ..... N83-29814 #

DOE/OR-20807/T1-VOL-1 ..... N83-29435 #
DOE/OR-20807/T1-VOL-2A ..... N83-29431 #
DOE/OR-20807/T1-VOL-4 ..... N83-29433 #

DOE/PC-30212/T4 ..... N83-29660 #
DOE/PC-40803/T5 ..... N83-29346 #
DOE/PC-50804/1 ..... N83-29335 #

DOE/RA-50324/T1 ..... N83-29420 #
DOE/RA-50381/1156-EXEC-SUMM ..... N83-29418 #

DOE/R5-10298/2 ..... N83-29850 #

DOE/SF-11566/2-VOL-1 ..... N83-29815 #
DOE/SF-11566/2-VOL-2 ..... N83-29816 #

DOT-TSC-UMTA-82-16 ..... N83-30329 #

DRDAR-QAM-72-82 ..... N83-30078 #

DRIC-T-8835 ..... N83-29988

DRSMI-RE-82-20-TR ..... N83-29565 #

DS-1982:10 ..... N83-29918 #
DS-1982:12 ..... N83-29919 #

DST-2700Z-001-83 ..... N83-29686 #
DST-2700Z-002-83 ..... N83-29687 #

DTNSRDC/CMLD-83/04 ..... N83-30081 #

DTNSRDC/SPD-1018-01 ..... N83-29638 #

E-170 ..... N83-29811* #
E-209 ..... N83-29710* #
E-209 ..... N83-29711* #
E-209 ..... N83-29712* #
E-209 ..... N83-29713* #
E-1525 ..... N83-29208* #
E-1568 ..... N83-29292* #
E-1628 ..... N83-29326* #
E-1641 ..... N83-29597* #
E-1656 ..... N83-29493* #
E-1669 ..... N83-30168* #
E-1672 ..... N83-29360* #
E-1679 ..... N83-29810* #
E-1712 ..... N83-29358* #
E-1716 ..... N83-29709* #
E-1718 ..... N83-29235* #
E-1724 ..... N83-29813* #
E-1731 ..... N83-29237* #
E-1738 ..... N83-29311* #
E-1749 ..... N83-29179* #
E-1753 ..... N83-29236* #
E-1767 ..... N83-30113* #

EDB-150600 ..... N83-29907 #

EGG-IS-5781 ..... N83-30169 #

EGG-M-07682 ..... N83-29717 #
EGG-M-28182 ..... N83-29913 #
EGG-M-29082 ..... N83-29879 #

EMD-2-68-2233 ..... N83-29825 #

EPA-AA-TEB-83-1 ..... N83-29724 #

EPA-450/3-81-015A ..... N83-29885 #
EPA-450/3-82-026 ..... N83-29886 #
EPA-460/3-82-003 ..... N83-29722 #
EPA-600/D-82-358 ..... N83-29380 #
EPA-600/D-83-001 ..... N83-29884 #
EPA-600/D-83-009 ..... N83-29889 #
EPA-600/J-82-261 ..... N83-29883 #
EPA-600/2-83-002 ..... N83-29378 #
EPA-600/2-83-007 ..... N83-29882 #
EPA-600/2-83-010 ..... N83-30316 #
EPA-600/3-83-004 ..... N83-29888 #
EPA-600/4-82-045 ..... N83-29354 #
EPA-600/4-83-006 ..... N83-29351 #
EPA-600/9-83-001 ..... N83-29349 #
EPA-903/9-82-004A ..... N83-30093 #
EPA-903/9-82-004B ..... N83-30094 #

EPA/AA/CTAB/FE/82-6 ..... N83-29721 #

EPA/AA/CTAB/PA/82-8 ..... N83-29441 #

EPRI-AP-2822-VOL-1 ..... N83-29715 #

EPRI-EA-1572-VOL-1 ..... N83-29818 #
EPRI-EA-2442 ..... N83-29820 #

EPRI-NP-2741 ..... N83-29310 #
EPRI-NP-2863 ..... N83-29668 #

ERADCOM/ASI-CR-83-0127-1 ..... N83-29928 #

ERIM-155200-1-F ..... N83-29567 #

ESA-CR(P)-1724 ..... N83-29671 #

ESA-SP-194 ..... N83-29494 #

ESD-TR-82-097 ..... N83-29580 #
ESD-TR-82-102 ..... N83-29578 #
ESD-TR-82-107 ..... N83-29610 #
ESD-TR-82-108 ..... N83-29611 #
ESD-TR-82-109 ..... N83-30128 #
ESD-TR-82-156 ..... N83-29564 #

ESD-2-0949 ..... N83-29929 #

ESG-DOE-13391 ..... N83-30218 #

ESL-711679-4 ..... N83-29571 #
ESL-711679-11 ..... N83-29579 #

ESN-36-12 ..... N83-30353 #

ETS-T-254 ..... N83-30151 #

E83-10304 ..... N83-29745* #
E83-10321 ..... N83-29746* #
E83-10326 ..... N83-29747* #
E83-10337 ..... N83-29748* #
E83-10338 ..... N83-29749* #
E83-10352 ..... N83-29750* #
E83-10353 ..... N83-29751* #
E83-10354 ..... N83-29752* #
E83-10355 ..... N83-29753* #
E83-10356 ..... N83-29754* #
E83-10357 ..... N83-29768* #
E83-10358 ..... N83-29769* #
E83-10359 ..... N83-29770* #
E83-10360 ..... N83-29771* #
E83-10361 ..... N83-29772* #
E83-10362 ..... N83-29773* #
E83-10363 ..... N83-29774* #
E83-10364 ..... N83-29775* #
E83-10365 ..... N83-29776* #
E83-10366 ..... N83-29777* #
E83-10368 ..... N83-29778* #
E83-10369 ..... N83-29779* #
E83-10370 ..... N83-29780* #
E83-10371 ..... N83-29781* #
E83-10372 ..... N83-29782* #

FAA-AM-82-19 ..... N83-29994 #

FAA-CT-82-76 ..... N83-29192 #
FAA-CT-83-22 ..... N83-29922 #

FAA-RD-82-78 ..... N83-29192 #

FCM-P11-1983 ..... N83-29940 #

FCM-R5-1982 ..... N83-29949 #

FCR-4294 ..... N83-30297* #

FERMILAB-CONF-82-65-THY ..... N83-30295 #

FHWA/OH-82/006 ..... N83-29460 #

FHWA/RD-80/192 ..... N83-29461 #
FHWA/RD-81/110 ..... N83-29792 #
FHWA/RD-81/111 ..... N83-29793 #
FHWA/RD-81/144 ..... N83-29475 #
FHWA/RD-81/159 ..... N83-29466 #
FHWA/RD-82/112 ..... N83-29794 #

FOA-C-30315-E1 ..... N83-29791 #
FOA-C-40167-B4 ..... N83-29881 #

FR-1-83 ..... N83-30012 #

FSRP-INT-299 ..... N83-29203 #

FTD-ID(RS)T-1274-82 ..... N83-29417 #
FTD-ID(RS)T-1342-82 ..... N83-29695 #
FTD-ID(RS)T-1384-82 ..... N83-29279 #
FTD-ID(RS)T-1545-82 ..... N83-29612 #
FTD-ID(RS)T-1608-82 ..... N83-30230 #
FTD-ID(RS)T-1611-82 ..... N83-29239 #
FTD-ID(RS)T-1691-82 ..... N83-29566 #
FTD-ID(RS)T-1775-82 ..... N83-29584 #
FTD-ID(RS)T-1859-82 ..... N83-30162 #
FTD-ID(RS)T-1861-82 ..... N83-30010 #
FTD-ID(RS)T-1874-82 ..... N83-29601 #

FTZ-445-TBR-22 ..... N83-29589 #
FTZ-454-TBR-36 ..... N83-29588 #

FWS/OBS-81/16 ..... N83-29890 #

FZM-7074 ..... N83-29318 #

GA-A-16736 ..... N83-29338 #
GA-A-16786 ..... N83-30254 #
GA-A-16787 ..... N83-30243 #
GA-A-16853 ..... N83-30251 #

GAO/MASAD-83-2 ..... N83-29202 #

GITI-REPT-19 ..... N83-29950 #

GJBX-14(83) ..... N83-29914 #
GJBX-174-82 ..... N83-29788 #

GPO-12-626 ..... N83-29412 #
GPO-12-821 ..... N83-30236 #
GPO-96-196 ..... N83-30323 #
GPO-96-481 ..... N83-29413 #

GPO-97-336 ..... N83-29185 #
GPO-99-908 ..... N83-29607 #

GRI-80/0148 ..... N83-29483 #
GRI-80/0158 ..... N83-29480 #
GRI-80/0172 ..... N83-29477 #
GRI-81-0097 ..... N83-29444 #
GRI-81-0118 ..... N83-29438 #
GRI-81/0048 ..... N83-29482 #
GRI-81/0090 ..... N83-29479 #
GRI-81/0093 ..... N83-29481 #
GRI-82-0024 ..... N83-29445 #
GRI-82/001.2 ..... N83-29478 #
GRI-83-0001 ..... N83-29350 #

HDL-TR-1999 ..... N83-29560 #

HSER-8826 ..... N83-29178* #

IA-137 ..... N83-30265 #

IAEA-CN-41/M-5-2 ..... N83-30261 #
IAEA-CN-41/N-6-1 ..... N83-30262 #

ICASE-83-1 ..... N83-30109* #
ICASE-83-8 ..... N83-30106* #
ICASE-83-11 ..... N83-29177* #
ICASE-83-17 ..... N83-30108* #
ICASE-83-22 ..... N83-30110* #
ICASE-83-24 ..... N83-29448* #
ICASE-83-26 ..... N83-30112* #
ICASE-83-27 ..... N83-30107* #
ICASE-83-28 ..... N83-30111* #
ICASE-83-29 ..... N83-30056* #

IFAOSR-208 ..... N83-29693 #

IFD-2/82 ..... N83-29183 #

IFM/TR-6.371.01 ..... N83-29469 #

IFSR-82 ..... N83-30253 #

IIHR-256 ..... N83-29637 #

IITRI-M06071-20 ..... N83-29393* #

INDU/DC/GMH/TR-83-54 ..... N83-30237 #

INFO-FT/82-04 ..... N83-29323 #
INFO-FT/82-06 ..... N83-29676 #

IPF-82-6 ..... N83-30257 #
IPF-82-8 ..... N83-30258 #
IPF-82-9 ..... N83-30259 #
IPF-82-10 ..... N83-30260 #
IPF-82-11 ..... N83-30261 #
IPF-82-12 ..... N83-30262 #
IPF-82-13 ..... N83-29701 #

IR-AL-010 ..... N83-30055* #

IR-MD-006 ..... N83-30046 #

IR-5 ..... N83-29945 #

IS-M-402 ..... N83-29839 #
IS-M-414 ..... N83-30137 #

IS-T-996 ..... N83-30281 #

ISBN-0-309-03332-2 ..... N83-30320 #
ISBN-0-309-03418-3 ..... N83-29723 #
ISBN-0-7988-2309-7 ..... N83-29752* #
ISBN-0-7988-2357-7 ..... N83-29409 #
ISBN-0-902937-63-4 ..... N83-29414 #
ISBN-0-902937-66-9 ..... N83-29411
ISBN-0-902937-69-3 ..... N83-29632 #
ISBN-0-902937-76-6 ..... N83-29394 #
ISBN-0-902937-78-2 ..... N83-29449 #
ISBN-0-902937-79-0 ..... N83-29633 #
ISBN-82-595-2687-8 ..... N83-29352 #
ISBN-90-6194-244-7 ..... N83-30104 #
ISBN-90-6196-236-6 ..... N83-30050 #
ISBN-90-6196-242-0 ..... N83-30103 #
ISBN-90-6196-243-9 ..... N83-30147 #
ISBN-90-6196-247-1 ..... N83-30105 #
ISBN-91-540-9142-X ..... N83-29484 #
ISBN-91-540-9143 ..... N83-29485 #
ISBN-91-7158-262-2 ..... N83-29917 #
ISBN-92-835-0327-9 ..... N83-29241 #
ISBN-92-835-1447-5 ..... N83-29277 #
ISBN-92-835-1448-3 ..... N83-29276 #
ISBN-951-41-0449-8 ..... N83-30051 #

ISI/RR-82-103 ..... N83-29573 #

ISI/RR-83-110 ..... N83-30066 #

ISSN-0077-5614 ..... N83-29723 #
ISSN-0082-0024 ..... N83-29917 #
ISSN-0090-5232 ..... N83-29207 #
ISSN-0143-7313 ..... N83-29990
ISSN-0143-7313 ..... N83-30015
ISSN-0144-6495 ..... N83-30210 #
ISSN-0170-1339 ..... N83-29184 #
ISSN-0170-1339 ..... N83-29301 #
ISSN-0170-1339 ..... N83-29648 #
ISSN-0170-1339 ..... N83-29649 #
ISSN-0170-8996 ..... N83-30314 #
ISSN-0262-5369 ..... N83-29487
ISSN-0340-7608 ..... N83-29240 #
ISSN-0340-7608 ..... N83-29347 #
ISSN-0340-7608 ..... N83-29374 #
ISSN-0340-7608 ..... N83-29375 #
ISSN-0340-7608 ..... N83-29376 #
ISSN-0340-7608 ..... N83-29377 #
ISSN-0340-7608 ..... N83-29407 #
ISSN-0340-7608 ..... N83-29408 #
ISSN-0340-7608 ..... N83-29459 #
ISSN-0340-7608 ..... N83-29619 #
ISSN-0340-7608 ..... N83-29620 #
ISSN-0340-7608 ..... N83-29621 #
ISSN-0340-7608 ..... N83-29622 #
ISSN-0340-7608 ..... N83-29623 #
ISSN-0340-7608 ..... N83-29868 #
ISSN-0340-7608 ..... N83-29869 #
ISSN-0340-7608 ..... N83-30256 #
ISSN-0340-7608 ..... N83-30286 #
ISSN-0340-7608 ..... N83-30287 #
ISSN-0340-7608 ..... N83-30288 #
ISSN-0340-7608 ..... N83-30289 #
ISSN-0340-7608 ..... N83-30290 #
ISSN-0340-7608 ..... N83-30291 #
ISSN-0347-4348 ..... N83-29484 #
ISSN-0347-4348 ..... N83-29485 #
ISSN-0355-0087 ..... N83-30051 #
ISSN-0379-6566 ..... N83-29494 #
ISSN-0436-1199 ..... N83-30206 #

IZF-1982-29-PT-1 ..... N83-29587 #

JAYCOR-J207-82-009 ..... N83-30238 #

JHU/APL/TG-1336 ..... N83-29319 #
JHU/APL/TG-1337 ..... N83-30278 #

JPL-PUB-82-90 ..... N83-29746* #
JPL-PUB-83-29 ..... N83-29808* #
JPL-PUB-83-35 ..... N83-29809* #

JPRS-83612 ..... N83-29280 #
JPRS-83745 ..... N83-29973 #

JSC-10615-REV-A ..... N83-29297* #

JSR-82-975 ..... N83-30161 #

K/UR-454 ..... N83-29788 #

KRC-82-10 ..... N83-29899 #

L-15536 ..... N83-29176* #
L-15538 ..... N83-30164* #
L-15556 ..... N83-29631* #
L-15583 ..... N83-29655* #
L-15626 ..... N83-29273* #
L-15635 ..... N83-30167* #

LA-UR-82-417 ..... N83-29819 #
LA-UR-82-428 ..... N83-29716 #
LA-UR-82-500 ..... N83-30282 #
LA-UR-82-783 ..... N83-30231 #
LA-UR-82-820 ..... N83-30183 #
LA-UR-82-878 ..... N83-29826 #
LA-UR-82-1034 ..... N83-30244 #
LA-UR-82-1046 ..... N83-30196 #
LA-UR-82-1063 ..... N83-30245 #
LA-UR-82-1071 ..... N83-30197 #
LA-UR-82-1130 ..... N83-30194 #
LA-UR-82-1238 ..... N83-30352 #
LA-UR-82-1358 ..... N83-30246 #
LA-UR-82-1427 ..... N83-29853 #
LA-UR-82-3416 ..... N83-29425 #
LA-UR-82-3776 ..... N83-29426 #
LA-UR-83-290 ..... N83-29667 #
LA-UR-83-519 ..... N83-30139 #
LA-UR-83-1266 ..... N83-30263 #

LA-9362-MS ..... N83-30193 #
LA-9385-MS ..... N83-30187 #
LA-9515-MS ..... N83-30083 #
LA-9576-MS ..... N83-29878 #

LA-9643-MS ..... N83-29586 #

LAIR-137 ..... N83-29971 #

LBL-13935 ..... N83-30248 #
LBL-14450 ..... N83-29661 #
LBL-14512 ..... N83-30184 #
LBL-14894 ..... N83-29907 #
LBL-15368 ..... N83-29405 #
LBL-15398 ..... N83-29343 #
LBL-15483 ..... N83-30201 #
LBL-15678 ..... N83-29646 #

LC-26-27766 ..... N83-29473 #
LC-53-61386 ..... N83-30292 #
LC-63-37059 ..... N83-30305 #
LC-82-50976 ..... N83-29723 #
LC-82-62183 ..... N83-30320 #
LC-82-600204 ..... N83-29385 #
LC-82-600207 ..... N83-29381 #
LC-82-600248 ..... N83-29382 #
LC-82-600266 ..... N83-29383 #
LC-82-600284 ..... N83-29410 #
LC-82-600598 ..... N83-29728* #
LC-82-600608 ..... N83-30296 #
LC-82-600626 ..... N83-29672 #
LC-82-600633 ..... N83-30303 #
LC-82-600636 ..... N83-29472 #
LC-82-600638 ..... N83-30045 #
LC-82-600639 ..... N83-30318 #

LFD-205 ..... N83-29486

LHNCBC-TR-82-28 ..... N83-30321 #
LHNCBC-TR-82-29 ..... N83-30322 #

LIDS-P-1252 ..... N83-30298 #

MATH-CENTRE-TRACTS-148 ..... N83-30050 #
MATH-CENTRE-TRACTS-150 ..... N83-30103 #
MATH-CENTRE-TRACTS-151 ..... N83-30147 #
MATH-CENTRE-TRACTS-152 ..... N83-30104 #
MATH-CENTRE-TRACTS-153 ..... N83-30105 #

MC-ZW-176/82 ..... N83-30141 #

MDC-H0072-VOL-2-PT-B ..... N83-29306* #

MDC-IRO296 ..... N83-29204* #

MDC-Q0796 ..... N83-30271* #

MDH-III-82-072 ..... N83-29863 #

MEDDELANDE/BULL-M82:22-PT-1 ..... N83-29484 #
MEDDELANDE/BULL-M82:23-PT-2 ..... N83-29485 #

MERADCOM-2366 ..... N83-29416 #

MITSG-82-19 ..... N83-29462 #

MLM-2900 ..... N83-29617 #
MLM-2934 ..... N83-29340 #
MLM-2936(OP) ..... N83-29867 #
MLM-2968(OP) ..... N83-29370 #

MPIS-18/1982 ..... N83-30206 #

MRC/WDC-R-048 ..... N83-29694 #

MRDC41081.9FR ..... N83-29575 #

MSRR-487 ..... N83-30134 #

M7/83 ..... N83-29997 #

NADC-81106-60 ..... N83-29200 #
NADC-82121-60 ..... N83-29450 #
NADC-82238-60 ..... N83-29366 #
NADC-83009-30 ..... N83-29683 #

NAE-AN-7 ..... N83-29187 #
NAE-AN-8 ..... N83-29188 #

NAEC-92-163 ..... N83-29402 #

NAPC-PE-80 ..... N83-29234* #

NAR-TR-270 ..... N83-29182 #

NAS 1.15:76949 ..... N83-29925* #
NAS 1.15:77046 ..... N83-29313* #
NAS 1.15:77106 ..... N83-30173* #
NAS 1.15:77107 ..... N83-30172* #
NAS 1.15:77216 ..... N83-30343* #
NAS 1.15:77241 ..... N83-30042* #

NAS 1.15:81697 ..... N83-29710* #
NAS 1.15:81698 ..... N83-29711* #
NAS 1.15:81699 ..... N83-29712* #
NAS 1.15:81701 ..... N83-29713* #
NAS 1.15:82495 ..... N83-29923* #
NAS 1.15:82514 ..... N83-30095* #
NAS 1.15:82529 ..... N83-29926* #
NAS 1.15:82531 ..... N83-29356* #
NAS 1.15:83326 ..... N83-29292* #
NAS 1.15:83341 ..... N83-29311* #
NAS 1.15:83363 ..... N83-29326* #
NAS 1.15:83373 ..... N83-29597* #
NAS 1.15:83383 ..... N83-29493* #
NAS 1.15:83392 ..... N83-30168* #
NAS 1.15:83393 ..... N83-29811* #
NAS 1.15:83395 ..... N83-29360* #
NAS 1.15:83401 ..... N83-29810* #
NAS 1.15:83423 ..... N83-29358* #
NAS 1.15:83428 ..... N83-29709* #
NAS 1.15:83429 ..... N83-29235* #
NAS 1.15:83432 ..... N83-29813* #
NAS 1.15:83436 ..... N83-29237* #
NAS 1.15:83447 ..... N83-29236* #
NAS 1.15:83448 ..... N83-29179* #
NAS 1.15:83453 ..... N83-30113* #
NAS 1.15:84297 ..... N83-29924* #
NAS 1.15:84334 ..... N83-29636* #
NAS 1.15:84367 ..... N83-29634* #
NAS 1.15:84371 ..... N83-29181* #
NAS 1.15:84378 ..... N83-29635* #
NAS 1.15:84381 ..... N83-29180* #
NAS 1.15:84614 ..... N83-29176* #
NAS 1.15:84615 ..... N83-30306* #
NAS 1.15:84624 ..... N83-29631* #
NAS 1.15:84627 ..... N83-29732* #
NAS 1.15:84630 ..... N83-29278* #
NAS 1.15:84650 ..... N83-29655* #
NAS 1.15:84661 ..... N83-29273* #
NAS 1.15:84663 ..... N83-30167* #
NAS 1.15:85008 ..... N83-29927* #
NAS 1.15:85015 ..... N83-29293* #
NAS 1.15:85031 ..... N83-30350* #
NAS 1.15:85034 ..... N83-30351* #
NAS 1.15:85041 ..... N83-29894* #
NAS 1.15:85043 ..... N83-29294* #
NAS 1.15:85045 ..... N83-30342* #
NAS 1.15:85046 ..... N83-29751* #
NAS 1.15:85055 ..... N83-30345* #
NAS 1.15:85057 ..... N83-30341* #
NAS 1.15:85065 ..... N83-30346* #
NAS 1.15:85067 ..... N83-30344* #
NAS 1.15:85253 ..... N83-29935* #
NAS 1.15:85338 ..... N83-29773* #
NAS 1.15:85355 ..... N83-29297* #
NAS 1.15:85389 ..... N83-29754* #
NAS 1.15:85390 ..... N83-29768* #
NAS 1.15:85391 ..... N83-29772* #
NAS 1.15:85392 ..... N83-29770* #
NAS 1.15:85638 ..... N83-29304* #
NAS 1.15:85664 ..... N83-29733* #
NAS 1.15:85837 ..... N83-30041* #
NAS 1.15:85841 ..... N83-29744* #
NAS 1.20:137-83 ..... N83-29298* #
NAS 1.21:7011(247) N83-29989*
NAS 1.26:3697 ..... N83-29731* #
NAS 1.26:3701 ..... N83-29174* #
NAS 1.26:3705 ..... N83-29725* #
NAS 1.26:3707 ..... N83-29992* #
NAS 1.26:3708 ..... N83-29993* #
NAS 1.26:3709 ..... N83-29270* #
NAS 1.26:3713 ..... N83-29198* #
NAS 1.26:158088 ..... N83-30328* #
NAS 1.26:166046 ..... N83-29314* #
NAS 1.26:166061 ..... N83-30061* #
NAS 1.26:166062 ..... N83-30062* #
NAS 1.26:166088 ..... N83-29272* #
NAS 1.26:166101 ..... N83-30166* #
NAS 1.26:166111 ..... N83-30106* #
NAS 1.26:166121 ..... N83-29271* #
NAS 1.26:166486 ..... N83-29186* #
NAS 1.26:166492 ..... N83-29771* #
NAS 1.26:166495 ..... N83-30325* #
NAS 1.26:166499 ..... N83-30053* #
NAS 1.26:166829 ..... N83-29778* #
NAS 1.26:166830 ..... N83-29779* #
NAS 1.26:166831 ..... N83-29780* #
NAS 1.26:166832 ..... N83-29782* #
NAS 1.26:166833 ..... N83-29781* #
NAS 1.26:167868 ..... N83-29393* #
NAS 1.26:167950 ..... N83-30297* #
NAS 1.26:168006 ..... N83-29812* #
NAS 1.26:168061 ..... N83-29359* #
NAS 1.26:168082 ..... N83-29596* #
NAS 1.26:168163 ..... N83-29234* #
NAS 1.26:168175 ..... N83-29492* #
NAS 1.26:168198 ..... N83-29734* #

NAS 1.26:170375 ..... N83-29745* #
NAS 1.26:170381 ..... N83-29746* #
NAS 1.26:170384 ..... N83-29747* #
NAS 1.26:170404 ..... N83-29204* #
NAS 1.26:170795 ..... N83-30034* #
NAS 1.26:170796 ..... N83-30035* #
NAS 1.26:170798 ..... N83-30271* #
NAS 1.26:170799 ..... N83-29308* #
NAS 1.26:170800 ..... N83-29305* #
NAS 1.26:170801 ..... N83-30055* #
NAS 1.26:170829 ..... N83-29306* #
NAS 1.26:171663 ..... N83-29748* #
NAS 1.26:172122 ..... N83-30052* #
NAS 1.26:172128 ..... N83-30109* #
NAS 1.26:172143 ..... N83-29315* #
NAS 1.26:172148 ..... N83-29177* #
NAS 1.26:172149 ..... N83-30110* #
NAS 1.26:172151 ..... N83-29448* #
NAS 1.26:172153 ..... N83-30165* #
NAS 1.26:172155 ..... N83-30108* #
NAS 1.26:172156 ..... N83-30107* #
NAS 1.26:172157 ..... N83-30111* #
NAS 1.26:172158 ..... N83-30056* #
NAS 1.26:172165 ..... N83-30112* #
NAS 1.26:172778 ..... N83-30347* #
NAS 1.26:172818 ..... N83-29893* #
NAS 1.26:172819 ..... N83-30171* #
NAS 1.26:172820 ..... N83-30182* #
NAS 1.26:172821 ..... N83-29728* #
NAS 1.26:172823 ..... N83-30123* #
NAS 1.26:172824 ..... N83-30348* #
NAS 1.26:172862 ..... N83-29809* #
NAS 1.26:172863 ..... N83-29808* #
NAS 1.26:172879 ..... N83-30339* #
NAS 1.26:172881 ..... N83-29752* #
NAS 1.26:172882 ..... N83-29753* #
NAS 1.26:172884 ..... N83-29769* #
NAS 1.26:172885 ..... N83-30336* #
NAS 1.26:172886 ..... N83-30326* #
NAS 1.26:172887 ..... N83-30327* #
NAS 1.26:172891 ..... N83-29774* #
NAS 1.26:172892 ..... N83-29775* #
NAS 1.26:172893 ..... N83-29776* #
NAS 1.26:172901 ..... N83-30057* #
NAS 1.26:172902 ..... N83-30058* #
NAS 1.26:172903 ..... N83-30059* #
NAS 1.26:172904 ..... N83-30060* #
NAS 1.26:172905 ..... N83-29489* #
NAS 1.26:172906 ..... N83-30054* #
NAS 1.26:172907 ..... N83-29749* #
NAS 1.26:172908 ..... N83-29777* #
NAS 1.26:186045 ..... N83-29178* #
NAS 1.36:3685 ..... N83-29175* #
NAS 1.55:2247 ..... N83-30016* #
NAS 1.55:2268 ..... N83-29208* #
NAS 1.60:2022 ..... N83-29750* #
NAS 1.60:2035 ..... N83-29193* #
NAS 1.60:2134 ..... N83-30164* #
NAS 1.61:1082(03) ..... N83-29491* #

NASA-CASE-ARC-11264-2 ..... N83-29991* #

NASA-CASE-GSC-12447-2 ..... N83-29302* #
NASA-CASE-GSC-12609-2 ..... N83-29681* #
NASA-CASE-GSC-12770-1 ..... N83-29324*
NASA-CASE-GSC-12816-1 ..... N83-30268* #
NASA-CASE-GSC-12817-1 ..... N83-29590* #
NASA-CASE-GSC-12818-1 ..... N83-29594* #

NASA-CASE-LAR-12531-1 ..... N83-29651*
NASA-CASE-LAR-12774-1 ..... N83-29654* #
NASA-CASE-LAR-12858-2 ..... N83-29391* #
NASA-CASE-LAR-12884-1 ..... N83-29446* #
NASA-CASE-LAR-12979-1 ..... N83-29173* #
NASA-CASE-LAR-13009-1 ..... N83-29706* #
NASA-CASE-LAR-13053-1 ..... N83-29783* #
NASA-CASE-LAR-13181-1 ..... N83-29591* #

NASA-CASE-LEW-12508-3 ..... N83-29625*
NASA-CASE-LEW-12876-2 ..... N83-29392* #
NASA-CASE-LEW-12950-2 ..... N83-29804* #
NASA-CASE-LEW-13132-1 ..... N83-29388*
NASA-CASE-LEW-13556-2 ..... N83-29805* #
NASA-CASE-LEW-13773-1 ..... N83-29197* #

NASA-CASE-MFS-25211-2 ..... N83-29592* #
NASA-CASE-MFS-25242-1 ..... N83-29650*
NASA-CASE-MFS-25315-1 ..... N83-29680*
NASA-CASE-MFS-25403-1 ..... N83-29303*
NASA-CASE-MFS-25535-2 ..... N83-29593* #

NASA-CASE-MSC-18936-1 ..... N83-29652*
NASA-CASE-MSC-20206-1 ..... N83-29325* #
NASA-CASE-MSC-20250-1 ..... N83-29707* #

NASA-CASE-NPO-14597-2 ..... N83-29708* #

NASA-CASE-NPO-15813-1 ..... N83-30269* #
NASA-CASE-NPO-15828-1 ..... N83-30222* #
NASA-CASE-NPO-16027-1 ..... N83-29595* #
NASA-CASE-NPO-16203-1 ..... N83-29806* #

NASA-CP-2247 ..... N83-30016* #
NASA-CP-2268 ..... N83-29208* #

NASA-CR-3685 ..... N83-29175* #
NASA-CR-3697 ..... N83-29731* #
NASA-CR-3701 ..... N83-29174* #
NASA-CR-3705 ..... N83-29725* #
NASA-CR-3707 ..... N83-29992* #
NASA-CR-3708 ..... N83-29993* #
NASA-CR-3709 ..... N83-29270* #
NASA-CR-3713 ..... N83-29198* #
NASA-CR-158088 ..... N83-30328* #
NASA-CR-166046 ..... N83-29314* #
NASA-CR-166061 ..... N83-30061* #
NASA-CR-166062 ..... N83-30062* #
NASA-CR-166088 ..... N83-29272* #
NASA-CR-166101 ..... N83-30166* #
NASA-CR-166111 ..... N83-30106* #
NASA-CR-166121 ..... N83-29271* #
NASA-CR-166486 ..... N83-29186* #
NASA-CR-166492 ..... N83-29771* #
NASA-CR-166495 ..... N83-30325* #
NASA-CR-166499 ..... N83-30053* #
NASA-CR-166829 ..... N83-29778* #
NASA-CR-166830 ..... N83-29779* #
NASA-CR-166831 ..... N83-29780* #
NASA-CR-166832 ..... N83-29782* #
NASA-CR-166833 ..... N83-29781* #
NASA-CR-167868 ..... N83-29393* #
NASA-CR-167950 ..... N83-30297* #
NASA-CR-168006 ..... N83-29812* #
NASA-CR-168061 ..... N83-29359* #
NASA-CR-168082 ..... N83-29596* #
NASA-CR-168163 ..... N83-29234* #
NASA-CR-168175 ..... N83-29492* #
NASA-CR-168198 ..... N83-29734* #
NASA-CR-170375 ..... N83-29745* #
NASA-CR-170381 ..... N83-29746* #
NASA-CR-170384 ..... N83-29747* #
NASA-CR-170404 ..... N83-29204* #
NASA-CR-170795 ..... N83-30034* #
NASA-CR-170796 ..... N83-30035* #
NASA-CR-170798 ..... N83-30271* #
NASA-CR-170799 ..... N83-29308* #
NASA-CR-170800 ..... N83-29305* #
NASA-CR-170801 ..... N83-30055* #
NASA-CR-170829 ..... N83-29306* #
NASA-CR-171663 ..... N83-29748* #
NASA-CR-172122 ..... N83-30052* #
NASA-CR-172128 ..... N83-30109* #
NASA-CR-172143 ..... N83-29315* #
NASA-CR-172148 ..... N83-29177* #
NASA-CR-172149 ..... N83-30110* #
NASA-CR-172151 ..... N83-29448* #
NASA-CR-172153 ..... N83-30165* #
NASA-CR-172155 ..... N83-30108* #
NASA-CR-172156 ..... N83-30107* #
NASA-CR-172157 ..... N83-30111* #
NASA-CR-172158 ..... N83-30056* #
NASA-CR-172165 ..... N83-30112* #
NASA-CR-172778 ..... N83-30347* #
NASA-CR-172818 ..... N83-29893* #
NASA-CR-172819 ..... N83-30171* #
NASA-CR-172820 ..... N83-30182* #
NASA-CR-172821 ..... N83-29728* #
NASA-CR-172823 ..... N83-30123* #
NASA-CR-172824 ..... N83-30348* #
NASA-CR-172862 ..... N83-29809* #
NASA-CR-172863 ..... N83-29808* #
NASA-CR-172879 ..... N83-30339* #
NASA-CR-172881 ..... N83-29752* #
NASA-CR-172882 ..... N83-29753* #
NASA-CR-172884 ..... N83-29769* #
NASA-CR-172885 ..... N83-30336* #
NASA-CR-172886 ..... N83-30326* #
NASA-CR-172887 ..... N83-30327* #
NASA-CR-172891 ..... N83-29774* #
NASA-CR-172892 ..... N83-29775* #
NASA-CR-172893 ..... N83-29776* #
NASA-CR-172901 ..... N83-30057* #
NASA-CR-172902 ..... N83-30058* #
NASA-CR-172903 ..... N83-30059* #
NASA-CR-172904 ..... N83-30060* #
NASA-CR-172905 ..... N83-29489* #
NASA-CR-172906 ..... N83-30054* #
NASA-CR-172907 ..... N83-29749* #
NASA-CR-172908 ..... N83-29777* #
NASA-CR-186045 ..... N83-29178* #

NASA-FACTS-137-83 ..... N83-29298* #

NASA-LAR-12775-2 ..... N83-29390* #

NASA-RP-1082(03) ..... N83-29491* #

NASA-SP-461 ..... N83-30340* #
NASA-SP-7011(247) N83-29989*

NASA-TM-76949 ..... N83-29925* #
NASA-TM-77046 ..... N83-29313* #
NASA-TM-77106 ..... N83-30173* #
NASA-TM-77107 ..... N83-30172* #
NASA-TM-77216 ..... N83-30343* #
NASA-TM-77241 ..... N83-30042* #
NASA-TM-81697 ..... N83-29710* #
NASA-TM-81698 ..... N83-29711* #
NASA-TM-81699 ..... N83-29712* #
NASA-TM-81701 ..... N83-29713* #
NASA-TM-82495 ..... N83-29923* #
NASA-TM-82514 ..... N83-30095* #
NASA-TM-82529 ..... N83-29926* #
NASA-TM-82531 ..... N83-29356* #
NASA-TM-83326 ..... N83-29292* #
NASA-TM-83341 ..... N83-29311* #
NASA-TM-83363 ..... N83-29326* #
NASA-TM-83373 ..... N83-29597* #
NASA-TM-83383 ..... N83-29493* #
NASA-TM-83392 ..... N83-30166* #
NASA-TM-83393 ..... N83-29811* #
NASA-TM-83395 ..... N83-29360* #
NASA-TM-83401 ..... N83-29810* #
NASA-TM-83423 ..... N83-29358* #
NASA-TM-83428 ..... N83-29709* #
NASA-TM-83429 ..... N83-29235* #
NASA-TM-83432 ..... N83-29813* #
NASA-TM-83436 ..... N83-29237* #
NASA-TM-83447 ..... N83-29236* #
NASA-TM-83448 ..... N83-29179* #
NASA-TM-83453 ..... N83-30113* #
NASA-TM-84297 ..... N83-29924* #
NASA-TM-84334 ..... N83-29636* #
NASA-TM-84367 ..... N83-29634* #
NASA-TM-84371 ..... N83-29181* #
NASA-TM-84378 ..... N83-29635* #
NASA-TM-84381 ..... N83-29180* #
NASA-TM-84614 ..... N83-29176* #
NASA-TM-84615 ..... N83-30306* #
NASA-TM-84624 ..... N83-29631* #
NASA-TM-84627 ..... N83-29732* #
NASA-TM-84630 ..... N83-29278* #
NASA-TM-84650 ..... N83-29655* #
NASA-TM-84661 ..... N83-29273* #
NASA-TM-84663 ..... N83-30167* #
NASA-TM-85008 ..... N83-29927* #
NASA-TM-85015 ..... N83-29293* #
NASA-TM-85031 ..... N83-30350* #
NASA-TM-85034 ..... N83-30351* #
NASA-TM-85041 ..... N83-29894* #
NASA-TM-85043 ..... N83-29294* #
NASA-TM-85045 ..... N83-30342* #
NASA-TM-85046 ..... N83-29751* #
NASA-TM-85055 ..... N83-30345* #
NASA-TM-85057 ..... N83-30341* #
NASA-TM-85065 ..... N83-30346* #
NASA-TM-85067 ..... N83-30344* #
NASA-TM-85253 ..... N83-29935* #
NASA-TM-85338 ..... N83-29773* #
NASA-TM-85355 ..... N83-29297* #
NASA-TM-85389 ..... N83-29754* #
NASA-TM-85390 ..... N83-29768* #
NASA-TM-85391 ..... N83-29772* #
NASA-TM-85392 ..... N83-29770* #
NASA-TM-85638 ..... N83-29304* #
NASA-TM-85664 ..... N83-29733* #
NASA-TM-85837 ..... N83-30041* #
NASA-TM-85841 ..... N83-29744* #

NASA-TP-2022 ..... N83-29750* #
NASA-TP-2035 ..... N83-29193* #
NASA-TP-2134 ..... N83-30164* #

NAVFAC-DM-2.9 ..... N83-29452 #

NAVHLTHRSCHC-83-2 ..... N83-30309 #

NBS-BSS-149 ..... N83-29472 #

NBS-GCR-82-415 ..... N83-30088 #
NBS-GCR-82-418 ..... N83-30046 #

NBS-MONO-25-SECT-19 ..... N83-30292 #

NBS-SP-400-73 ..... N83-29672 #
NBS-SP-500-97 ..... N83-30045 #
NBS-SP-640 ..... N83-29728* #
NBS-SP-645 ..... N83-29473 #

NBS-TN-1057 ..... N83-29702 #
NBS-TN-1057 ..... N83-29705 #
NBS-TN-1058 ..... N83-29703 #
NBS-TN-1161 ..... N83-29624 #

NBSIR-82-1675 ..... N83-29355 #
NBSIR-82-2510 ..... N83-30234 #
NBSIR-82-2561 ..... N83-29679 #
NBSIR-82-2571 ..... N83-29384 #
NBSIR-82-2606 ..... N83-29471 #
NBSIR-82-2611 ..... N83-29673 #
NBSIR-82-2612 ..... N83-29463 #
NBSIR-82-2619 ..... N83-30049 #
NBSIR-82-2631-AF ..... N83-30092 #
NBSIR-82-2636 ..... N83-29675 #

NCEL-TN-1656 ..... N83-29453 #

NEPRF-CR-83-01 ..... N83-29933 #

NEPRF-TR-83-04 ..... N83-29934 #

NHL-2-82053 ..... N83-29352 #

NI-321-591-186-83 ..... N83-29588 #
NI-321574-142-83 ..... N83-29589 #

NIH-N01-HV-2926-2 ..... N83-30007 #

NISC-TRANS-6974 ..... N83-29295 #

NLM-TSD-83-01 ..... N83-30317 #

NMAB-392 ..... N83-29386 #
NMAB-393 ..... N83-29387 #

NOAA-DR-ERL-PMEL-7 ..... N83-29960 #

NOAA-NWS-ERCP-6 ..... N83-29944 #
NOAA-NWS-ERCP-7 ..... N83-29943 #

NOAA-S/T-82-255 ..... N83-29795 #
NOAA-S/T-83-4 ..... N83-29942 #

NOAA-TM-ERL-PMEL-37 ..... N83-29966 #

NOAA-TM-ERL-WPL-103 ..... N83-30170 #

NOAA-TM-NESS-119 ..... N83-29795 #

NOAA-TM-NOS-NGS-35 ..... N83-29801 #

NOAA-TM-NWS-NSSFC-5 ..... N83-29941 #

NOAA-TM-OTES-4 ..... N83-29964 #

NOAA-TR-NESS-92 ..... N83-29963 #

NOAA-TR-NWS-34 ..... N83-29942 #

NOAA-82072303 ..... N83-29801 #
NOAA-83011001 ..... N83-29947 #
NOAA-83011206 ..... N83-29964 #
NOAA-83011303 ..... N83-29963 #
NOAA-83013101 ..... N83-29946 #
NOAA-83020701 ..... N83-29943 #
NOAA-83020901 ..... N83-29944 #
NOAA-83022306 ..... N83-29960 #

NOR-83-70 ..... N83-29314* #

NORDA-TN-181 ..... N83-29952 #
NORDA-TN-186-VOL-1 ..... N83-29291 #
NORDA-TN-189 ..... N83-30299 #
NORDA-TN-201 ..... N83-29955 #

NORSAR-CONTRIB-323 ..... N83-29898 #

NORSAR-SR-2-81/82 ..... N83-29898 #

NOSC/TD-560 ..... N83-30039 #

NP-2904018 ..... N83-29825 #

NPL-DITC-16/83 ..... N83-29487

NPL-DMA(A)63 ..... N83-30015
NPL-DMA(A)64 ..... N83-29990

NPS52-83-002 ..... N83-30124 #
NPS55-82-035 ..... N83-30077 #

NRC-21276 ..... N83-29187 #
NRC-21277 ..... N83-29188 #

NRL-MR-4885 ..... N83-29320 #

NRL-MR-4992 ..... N83-30130 #
NRL-MR-5011 ..... N83-29684 #
NRL-MR-5016 ..... N83-29400 #
NRL-MR-5026 ..... N83-30179 #
NRL-MR-5037 ..... N83-30176 #
NRL-MR-5042 ..... N83-30082 #
NRL-MR-5048 ..... N83-29735 #

NRL-8655 ..... N83-29568 #

NSB-GCR-82-412 ..... N83-29348 #

NSF-DMR81-19500 ..... N83-29704 #

NSF-82-78 ..... N83-30263 #
NSF-83-7 ..... N83-30319 #

NSF/CEE-82013 ..... N83-29465 #
NSF/CEE-82053 ..... N83-29464 #
NSF/CEE-82064 ..... N83-29470 #
NSF/CEE-82072 ..... N83-29474 #
NSF/CEE-82074 ..... N83-29939 #
NSF/CEE-82075 ..... N33-29476 #
NSF/CEE-82090 ..... N83-29468 #

NSF/ECS-82010 ..... N83-30159 #
NSF/ECS-82015 ..... N83-30138 #
NSF/ECS-83006 ..... N83-30089 #

NSF/PRA-82045 ..... N83-30263 #
NSF/PRA-83044 ..... N83-30304 #

NSF/PRM-82006 ..... N83-30319 #

NSMRL-956 ..... N83-30002 #
NSMRL-980 ..... N83-30003 #

NSTL/ERL-195 ..... N83-29770* #
NSTL/ERL-199 ..... N83-29772* #
NSTL/ERL-205 ..... N83-29768* #

NSV/CEE-82085 ..... N83-30145 #

NSWC/MP-82-442 ..... N83-29657 #

NSWC/TR-82-526 ..... N83-29604 #
NSWC/TR-82-528 ..... N83-29603 #
NSWC/TR-82-530 ..... N83-29605 #
NSWC/TR-83-14 ..... N83-30178 #

NTSB/SIR-83-02 ..... N83-29189 #

NUREG/CR-2279 ..... N83-29457 #
NUREG/CR-3086 ..... N83-29740 #

NUREG/ER-2997-VOL-2 ..... N83-29739 #

NUSC-TR-6771 ..... N83-29574 #
NUSC-TR-6775 ..... N83-29577 #

NWC-TP-6421 ..... N83-29570 #

NYSERDA-82-24 ..... N83-29443 #

OEHL-83-072EH003ANA ..... N83-30040 #

ONR-8208 ..... N83-30063 #

ONWI-268 ..... N83-29787 #

ORC-82-7 ..... N83-30159 #

ORI-TR-1905 ..... N83-29491* #

ORNL/ENG-EM-24 ..... N83-29339 #

ORNL/SUB-81-1012/1 ..... N83-30293 #
ORNL/SUB-7551/2 ..... N83-29643 #

ORNL/TM-8243 ..... N83-29321 #
ORNL/TM-8391 ..... N83-29827 #
ORNL/TM-8496 ..... N83-30240 #
ORNL/TM-8527-VOL-2 ..... N83-29739 #
ORNL/TM-8530 ..... N83-30242 #
ORNL/TM-8553 ..... N83-30097 #
ORNL/TM-8555 ..... N83-29404 #

OSD/FCSC-83-001 ..... N83-30047 #

OTA-CIT-187 ..... N83-30296 #

OTA-TM-H-11 ..... N83-30318 #

OTA-TM-STI-19 ..... N83-30303 #

OU/NPL-52-82 ..... N83-30211 #

OUEL-1430/82 ..... N83-30102 #

OWRT-A-035-MINN(2) ..... N83-29800 #
OWRT-A-107-WA(1) ..... N83-29938 #
OWRT-A-115-WA(1) ..... N83-29938 #

PB82-263161 ..... N83-29387 #
PB83-101626 ..... N83-29676 #
PB83-101642 ..... N83-29323 #
PB83-137448 ..... N83-30092 #
PB83-143917 ..... N83-29464 #
PB83-144162 ..... N83-29721 #
PB83-145185 ..... N83-29469 #
PB83-146092 ..... N83-30094 #
PB83-146100 ..... N83-30093 #
PB83-146845 ..... N83-29672 #
PB83-146936 ..... N83-30234 #
PB83-147736 ..... N83-29465 #
PB83-148064 ..... N83-29799 #
PB83-148435 ..... N83-29379 #
PB83-148635 ..... N83-30329 #
PB83-148809 ..... N83-30321 #
PB83-148908 ..... N83-29484 #
PB83-148916 ..... N83-29485 #
PB83-148931 ..... N83-29704 #
PB83-149211 ..... N83-29723 #
PB83-149385 ..... N83-29624 #
PB83-149450 ..... N83-29726* #
PB83-149930 ..... N83-30170 #
PB83-150532 ..... N83-29462 #
PB83-150656 ..... N83-29348 #
PB83-151266 ..... N83-29673 #
PB83-152009 ..... N83-29380 #
PB83-152181 ..... N83-29684 #
PB83-152314 ..... N83-29471 #
PB83-152645 ..... N83-29437 #
PB83-152694 ..... N83-29460 #
PB83-153056 ..... N83-29378 #
PB83-153403 ..... N83-29741 #
PB83-153718 ..... N83-29683 #
PB83-154377 ..... N83-29800 #
PB83-154641 ..... N83-29801 #
PB83-155275 ..... N83-29674 #
PB83-155887 ..... N83-29463 #
PB83-155952 ..... N83-29792 #
PB83-155960 ..... N83-29793 #
PB83-155978 ..... N83-29794 #
PB83-155994 ..... N83-30007 #
PB83-156109 ..... N83-30304 #
PB83-156158 ..... N83-30315 #
PB83-156315 ..... N83-29466 #
PB83-156372 ..... N83-29722 #
PB83-156612 ..... N83-29702 #
PB83-156687 ..... N83-29461 #
PB83-156703 ..... N83-30322 #
PB83-156869 ..... N83-29385 #
PB83-156877 ..... N83-29795 #
PB83-156885 ..... N83-29966 #
PB83-156968 ..... N83-29384 #
PB83-157537 ..... N83-29959 #
PB83-157628 ..... N83-29470 #
PB83-157651 ..... N83-29383 #
PB83-157669 ..... N83-29690 #
PB83-157701 ..... N83-29382 #
PB83-157719 ..... N83-29381 #
PB83-157743 ..... N83-29685 #
PB83-157800 ..... N83-30320 #
PB83-157875 ..... N83-29410 #
PB83-157883 ..... N83-29203 #
PB83-157966 ..... N83-30263 #
PB83-158451 ..... N83-29964 #
PB83-159319 ..... N83-29682 #
PB83-159483 ..... N83-29802 #
PB83-159764 ..... N83-29742 #
PB83-159772 ..... N83-29920 #
PB83-159848 ..... N83-29949 #
PB83-159905 ..... N83-29948 #
PB83-159954 ..... N83-30319 #
PB83-161042 ..... N83-29483 #
PB83-161059 ..... N83-29482 #
PB83-161117 ..... N83-29947 #
PB83-161133 ..... N83-29963 #
PB83-161406 ..... N83-29481 #
PB83-161646 ..... N83-29886 #
PB83-161679 ..... N83-29921 #
PB83-161729 ..... N83-29942 #
PB83-161851 ..... N83-29439 #
PB83-161919 ..... N83-29440 #
PB83-161943 ..... N83-30142 #
PB83-162024 ..... N83-29965 #
PB83-162057 ..... N83-30331 #
PB83-162065 ..... N83-30332 #
PB83-162321 ..... N83-29941 #
PB83-163212 ..... N83-29798 #
PB83-163311 ..... N83-29409 #
PB83-163345 ..... N83-29467 #

PB83-163725 ..... N83-29939 #
PB83-163915 ..... N83-29946 #
PB83-163923 ..... N83-29677 #
PB83-163931 ..... N83-29678 #
PB83-163972 ..... N83-29441 #
PB83-163998 ..... N83-29940 #
PB83-164236 ..... N83-29945 #
PB83-164335 ..... N83-29476 #
PB83-164376 ..... N83-30088 #
PB83-164384 ..... N83-30045 #
PB83-164400 ..... N83-29472 #
PB83-164418 ..... N83-30048 #
PB83-164483 ..... N83-29349 #
PB83-164541 ..... N83-30305 #
PB83-164566 ..... N83-29919 #
PB83-164574 ..... N83-29797 #
PB83-164715 ..... N83-30207 #
PB83-164749 ..... N83-30316 #
PB83-164764 ..... N83-29442 #
PB83-164798 ..... N83-30208 #
PB83-164814 ..... N83-30209 #
PB83-164848 ..... N83-29475 #
PB83-164863 ..... N83-29354 #
PB83-164913 ..... N83-30143 #
PB83-164939 ..... N83-30210 #
PB83-164947 ..... N83-30338 #
PB83-164962 ..... N83-30292 #
PB83-164996 ..... N83-29705 #
PB83-165019 ..... N83-29679 #
PB83-165027 ..... N83-29703 #
PB83-165043 ..... N83-29675 #
PB83-165068 ..... N83-29355 #
PB83-165092 ..... N83-30144 #
PB83-165134 ..... N83-29474 #
PB83-165167 ..... N83-30235 #
PB83-165365 ..... N83-29916 #
PB83-165514 ..... N83-29918 #
PB83-165530 ..... N83-29889 #
PB83-165548 ..... N83-29724 #
PB83-165605 ..... N83-30211 #
PB83-165621 ..... N83-29917 #
PB83-165696 ..... N83-29468 #
PB83-165837 ..... N83-29888 #
PB83-165944 ..... N83-30213 #
PB83-165951 ..... N83-30091 #
PB83-165969 ..... N83-30264 #
PB83-166082 ..... N83-29944 #
PB83-166090 ..... N83-29962 #
PB83-166108 ..... N83-29961 #
PB83-166397 ..... N83-29796 #
PB83-166470 ..... N83-30265 #
PB83-166496 ..... N83-30337 #
PB83-166512 ..... N83-30303 #
PB83-166546 ..... N83-29353 #
PB83-166595 ..... N83-30090 #
PB83-166850 ..... N83-30212 #
PB83-167122 ..... N83-29943 #
PB83-167148 ..... N83-29473 #
PB83-167171 ..... N83-30089 #
PB83-167197 ..... N83-30159 #
PB83-167213 ..... N83-30138 #
PB83-167221 ..... N83-29480 #
PB83-167239 ..... N83-29479 #
PB83-167247 ..... N83-29438 #
PB83-167254 ..... N83-29478 #
PB83-167502 ..... N83-29477 #
PB83-167593 ..... N83-29938 #
PB83-167643 ..... N83-30146 #
PB83-168187 ..... N83-29202 #
PB83-168658 ..... N83-30318 #
PB83-168930 ..... N83-29887 #
PB83-169144 ..... N83-29443 #
PB83-169441 ..... N83-30049 #
PB83-169755 ..... N83-30145 #
PB83-169904 ..... N83-30048 #
PB83-169961 ..... N83-29960 #
PB83-170860 ..... N83-30317 #
PB83-171041 ..... N83-29352 #
PB83-171132 ..... N83-29386 #
PB83-172536 ..... N83-29351 #
PB83-172635 ..... N83-30047 #
PB83-173369 ..... N83-29444 #
PB83-173393 ..... N83-29445 #
PB83-173419 ..... N83-29350 #
PB83-174664 ..... N83-30296 #
PB83-917003 ..... N83-29189 #

PDRC-83-01 ..... N83-30122 #
PDRC-83-02 ..... N83-30125 #

PFC/CP-83-3 ..... N83-29613 #

PFC/RR-82-10 ..... N83-30247 #

PLASMA-PHYSICS-PUB-82-09 ..... N83-29603 #
PLASMA-PHYSICS-PUB-82-10 ..... N83-29605 #

PLASMA-PHYSICS-PUB-82-11 ..... N83-30178 #
PLASMA-PHYSICS-PUB-82-12 ..... N83-29604 #

PML-1981-46 ..... N83-29389

PNL-SA-10416 ..... N83-29873 #
PNL-SA-10869 ..... N83-29312 #
PNL-SA-11022 ..... N83-29432 #
PNL-SA-11190 ..... N83-29332 #

PNL-3978 ..... N83-29859 #
PNL-4044 ..... N83-30200 #

PNR-90147 ..... N83-29669 #
PNR-90148 ..... N83-29670 #
PNR-90149 ..... N83-29322 #

PPSP/PPRP-60 ..... N83-29887 #

PR-728 ..... N83-30335
PR-764 ..... N83-30333
PR-775 ..... N83-30334

PRA-8049 ..... N83-29194 #

PREPRINT-164 ..... N83-30343* #
PREPRINT-207 ..... N83-30341* #

PUBL-97-128 ..... N83-30236 #

P83-00030 ..... N83-30009 #

QPR-5 ..... N83-29346 #

QTPR-1 ..... N83-29863 #

QTR-28 ..... N83-29563 #

R-886 ..... N83-29600 #
R-895 ..... N83-30118 #
R-902 ..... N83-30119 #
R-914 ..... N83-30117 #
R-945 ..... N83-29582 #
R-965 ..... N83-30126 #
R-966 ..... N83-30098 #
R-973 ..... N83-29583 #
R-975 ..... N83-30275 #
R-977 ..... N83-29607 #
R-979 ..... N83-30100 #
R-980 ..... N83-29608 #
R-983 ..... N83-30229 #

R/RM-SER-62 ..... N83-29467 #

RADC-TR-82-250 ..... N83-29571 #
RADC-TR-82-308 ..... N83-30227 #
RADC-TR-82-310 ..... N83-30099 #
RADC-TR-82-311 ..... N83-29692 #
RADC-TR-82-313 ..... N83-30071 #
RADC-TR-82-320 ..... N83-29307 #
RADC-TR-82-328 ..... N83-29579 #
RADC-TR-82-329 ..... N83-29606 #
RADC-TR-82-331 ..... N83-30158 #
RADC-TR-83-8 ..... N83-29658 #

RAND/N-1949-ARPA ..... N83-30181 #

RCC/MG-104-83 ..... N83-29935* #
RCC/MG-361-83 ..... N83-29935* #

RDXJ-RD-84-1 ..... N83-30301 #

REPRINT-838 ..... N83-29669 #
REPRINT-839 ..... N83-29670 #
REPRINT-840 ..... N83-29322 #

REPT-2 ..... N83-30336* #
REPT-2-32300/3R-53434-VOL-2 ..... N83-29305* #
REPT-7 ..... N83-29401 #
REPT-10 ..... N83-29948 #
REPT-10-82 ..... N83-29486
REPT-81-03-08-4 ..... N83-29353 #
REPT-82-2 ..... N83-30014 #
REPT-82-152 ..... N83-29692 #
REPT-82SRC62 ..... N83-30074 #
REPT-83-SRD-013 ..... N83-29365 #
REPT-194 ..... N83-29773* #
REPT-341 ..... N83-30121 #
REPT-342 ..... N83-29902 #
REPT-432-ET-FUC-82 ..... N83-29443 #
REPT-1248-1TR2 ..... N83-29640 #
REPT-1981-22 ..... N83-30235 #
REPT-1982-10 ..... N83-29916 #

RFP-TRANS-358 ..... N83-29344 #

RHO-WM-SA-4 ..... N83-30215 #

RL-81-055 ..... N83-30213 #
RL-81-088 ..... N83-30091 #
RL-81-091 ..... N83-30337 #
RL-82-01 ..... N83-30212 #
RL-82-001 ..... N83-30207 #
RL-82-004 ..... N83-30208 #
RL-82-007 ..... N83-30090 #
RL-82-008 ..... N83-30209 #
RL-82-010 ..... N83-30264 #
RL-82-013 ..... N83-30338 #

RR-247 ..... N83-30114 #

RTCA/DO-145 ..... N83-29488 #
RTCA/DO-146 ..... N83-29488 #
RTCA/DO-168 ..... N83-29488 #
RTCA/DO-183 ..... N83-29488 #

R83-956181F ..... N83-29308* #

SAI-83-144-WA ..... N83-29904 #
SAI-093-82-005IJ ..... N83-29928 #

SAM-TR-82-41 ..... N83-29998 #

SAN-2117-2 ..... N83-29840 #

SAND-80-2517 ..... N83-30217 #
SAND-81-1732 ..... N83-29457 #
SAND-81-1842C ..... N83-29860 #
SAND-81-2580C ..... N83-29823 #
SAND-81-2651 ..... N83-30233 #
SAND-81-7080/6 ..... N83-29834 #
SAND-81-7085/17 ..... N83-29849 #
SAND-81-7089/6 ..... N83-29844 #
SAND-82-0219 ..... N83-29908 #
SAND-82-0338C ..... N83-29427 #
SAND-82-0381C ..... N83-29861 #
SAND-82-0472C ..... N83-29428 #
SAND-82-0478C ..... N83-29429 #
SAND-82-0642C ..... N83-29337 #
SAND-82-0715 ..... N83-29851 #
SAND-82-0775C ..... N83-29866 #
SAND-82-0789C ..... N83-29616 #
SAND-82-0911C ..... N83-29665 #
SAND-82-1001C ..... N83-29430 #
SAND-82-1199C ..... N83-29958 #
SAND-82-1368C ..... N83-29659 #
SAND-82-1378C ..... N83-29858 #
SAND-82-1825 ..... N83-29838 #
SAND-82-2249 ..... N83-29842 #
SAND-82-2517 ..... N83-30136 #
SAND-82-7005C ..... N83-29615 #
SAND-82-7009 ..... N83-29852 #
SAND-82-7027 ..... N83-29719 #
SAND-82-7044C ..... N83-29662 #
SAND-82-7060 ..... N83-29821 #
SAND-82-7088/1 ..... N83-29837 #
SAND-82-8007 ..... N83-29835 #
SAND-82-8025 ..... N83-29843 #

SATR-2 ..... N83-30174 #

SCIENTIFIC-4 ..... N83-30064 #

SCR-518(PSL-83-159) ..... N83-29490 #

SD-TR-83-04 ..... N83-29691 #
SD-TR-83-06 ..... N83-29395 #

SEL-160 ..... N83-30115 #
SEL-166 ..... N83-30127 #

SER-510126 ..... N83-30166* #

SERI/STR-214-1730 ..... N83-29833 #
SERI/STR-231-1886 ..... N83-29880 #

SERI/TR-231-1595 ..... N83-29857 #
SERI/TR-231-1918 ..... N83-29845 #
SERI/TR-252-1569 ..... N83-29856 #
SERI/TR-253-1512 ..... N83-29830 #
SERI/TR-254-1727 ..... N83-29831 #
SERI/TR-631-1330 ..... N83-29828 #

SGD-459-PT-1 ..... N83-30331 #
SGD-459-PT-2 ..... N83-30332 #

SGR-49 ..... N83-29946 #

SGU-C-793 ..... N83-29917 #

SIO-REF-82-31 ..... N83-29581 #

SLWM-82-4 ..... N83-29945 #

SOLAR/1006-82/50 ..... N83-29456 #
SOLAR/2055-82/14 ..... N83-29854 #
SOLAR/2089-82/14 ..... N83-29855 #

SR-P1-04163 ..... N83-29748* #

SR-SER-501 ..... N83-29464 #

SR-1 ..... N83-30085 #
SR-1 ..... N83-30121 #
SR-1 ..... N83-30153 #
SR-2 ..... N83-29682 #
SR-2 ..... N83-29902 #
SR-3 ..... N83-29300 #
SR-3 ..... N83-29936 #

SRA-R920016-1 ..... N83-30276 #

SRI-MP-83-035 ..... N83-30174 #

SSS-R-80-4383 ..... N83-29896 #
SSS-R-82-5571 ..... N83-29895 #
SSS-R-83-5868 ..... N83-29903 #

STF60-A82053 ..... N83-29352 #

SU-AR-1 ..... N83-29602 #

SU-NA-83-01 ..... N83-30123* #

SU-SLAC-PUB-2880 ..... N83-30188 #
SU-SLAC-PUB-3005 ..... N83-30203 #
SU-SLAC-PUB-3015 ..... N83-30204 #

SU-STAN-CS-82-948 ..... N83-30310 #

SU-SUIPR-949 ..... N83-30347* #

SU-TR-21 ..... N83-30148 #
SU-TR-330 ..... N83-30149 #

SWRI-7080 ..... N83-29359* #

TACOM-TR-12685 ..... N83-29899 #
TACOM-TR-12686 ..... N83-29194 #

TASC-TR-3164 ..... N83-29296 #

TB-82-5 ..... N83-29207 #

TDCK-76162 ..... N83-29389
TDCK-77329 ..... N83-29587 #

TE350-24-83 ..... N83-29609 #
TE4229-383-82 ..... N83-29478 #

TNO-81-016265 ..... N83-29653
TNO-82-0344 ..... N83-29803

TR-CS-83-1 ..... N83-30079 #

TR-1 ..... N83-29329 #
TR-3 ..... N83-29369 #
TR-4 ..... N83-29598 #
TR-5-ONR ..... N83-30226 #
TR-6 ..... N83-29367 #
TR-8 ..... N83-29396 #
TR-9 ..... N83-29364 #
TR-13 ..... N83-29328 #
TR-21 ..... N83-29327 #
TR-28 ..... N83-30274 #
TR-30 ..... N83-29697 #
TR-76 ..... N83-29938 #
TR-82-131-01-VOL-1 ..... N83-30094 #
TR-82-131-01-VOL-2 ..... N83-30093 #
TR-88 ..... N83-29737 #
TR-112-12 ..... N83-30150 #
TR-620 ..... N83-29578 #
TR-631 ..... N83-29564 #
TR-632 ..... N83-30128 #
TR-633 ..... N83-29610 #
TR-0083(3725)-1 ..... N83-29691 #
TR-0083(3935-02)-1 ..... N83-29395 #
TR-1214 ..... N83-30116 #
TR-881102 ..... N83-29270* #

TRB/NCHRP/REP-248 ..... N83-29723 #

TSD-BOOK-0001/82 ..... N83-29409 #

TSR-45 ..... N83-30129 #

TTL-83-1 ..... N83-29596* #

UAG-79 ..... N83-30348* #
UAG-86 ..... N83-29921 #

UB/EERC-82/06 ..... N83-29465 #

UCB/EERC-82/08 ..... N83-29470 #
UCB/EERC-82/18 ..... N83-29742 #

UCID-19382 ..... N83-30216 #
UCID-19411 ..... N83-30313 #
UCID-19419 ..... N83-29646 #
UCID-19429 ..... N83-29645 #
UCID-19432 ..... N83-30085 #
UCID-19434 ..... N83-29458 #
UCID-19440 ..... N83-29864 #
UCID-19609 ..... N83-29424 #
UCID-19656 ..... N83-29727 #
UCID-19733 ..... N83-30255 #

UCRL-TRANS-1776 ..... N83-29614 #

UCRL-15452 ..... N83-29865 #
UCRL-53045 ..... N83-29372 #
UCRL-53261 ..... N83-30312 #
UCRL-53276 ..... N83-29700 #
UCRL-66162-REV-1 ..... N83-29662 #
UCRL-87065 ..... N83-30214 #
UCRL-87183 ..... N83-29664 #
UCRL-87218 ..... N83-30232 #
UCRL-87225 ..... N83-29911 #
UCRL-87422 ..... N83-30249 #
UCRL-87536 ..... N83-29910 #
UCRL-87582 ..... N83-29912 #
UCRL-87613 ..... N83-29406 #
UCRL-87671 ..... N83-30250 #
UCRL-87745 ..... N83-30154 #
UCRL-87752 ..... N83-29663 #
UCRL-87784 ..... N83-30086 #
UCRL-88105 ..... N83-29698 #
UCRL-88313 ..... N83-30241 #
UCRL-88532 ..... N83-29720 #
UCRL-88642 ..... N83-30155 #

UILU-ENG-80-2218 ..... N83-29600 #
UILU-ENG-80-2227 ..... N83-30118 #
UILU-ENG-80-2237 ..... N83-30119 #
UILU-ENG-81-2245 ..... N83-30117 #
UILU-ENG-82-1719 ..... N83-30135 #
UILU-ENG-82-2011 ..... N83-29464 #
UILU-ENG-82-2013 ..... N83-29741 #
UILU-ENG-82-2211 ..... N83-29582 #
UILU-ENG-82-2231 ..... N83-30126 #
UILU-ENG-82-2232 ..... N83-30098 #
UILU-ENG-82-2239 ..... N83-29583 #
UILU-ENG-82-2241 ..... N83-30275 #
UILU-ENG-82-2243 ..... N83-29607 #
UILU-ENG-82-2245 ..... N83-30100 #
UILU-ENG-83-2201 ..... N83-29608 #
UILU-ENG-83-2204 ..... N83-30229 #

UIUCDCS-R-82-1093 ..... N83-30135 #

ULF-421/CAR ..... N83-30064 #

ULRF-414/CAR ..... N83-30065 #

UMTA-MA-06-0099-82-4 ..... N83-30329 #

UMTA-URT-41-83-2 ..... N83-30048 #

UROCHESTER/DC-83-TR-30 ..... N83-29697 #

UROCHESTER/DC/83/TR-31 ..... N83-29696 #

US-PATENT-APPL-SN-224232 ..... N83-29680*
US-PATENT-APPL-SN-235868 ..... N83-29625*
US-PATENT-APPL-SN-246773 ..... N83-29650*
US-PATENT-APPL-SN-248745 ..... N83-29303*
US-PATENT-APPL-SN-272152 ..... N83-29388*
US-PATENT-APPL-SN-282191 ..... N83-29651*
US-PATENT-APPL-SN-301075 ..... N83-29324*
US-PATENT-APPL-SN-325082 ..... N83-29652*
US-PATENT-APPL-SN-393583 ..... N83-29392* #
US-PATENT-APPL-SN-401288 ..... N83-29708* #
US-PATENT-APPL-SN-411767 ..... N83-30222* #
US-PATENT-APPL-SN-432057 ..... N83-29592* #
US-PATENT-APPL-SN-461788 ..... N83-29390* #
US-PATENT-APPL-SN-463440 ..... N83-29805* #
US-PATENT-APPL-SN-465370 ..... N83-29991* #
US-PATENT-APPL-SN-469867 ..... N83-29197* #
US-PATENT-APPL-SN-476244 ..... N83-29593* #
US-PATENT-APPL-SN-478129 ..... N83-29325* #
US-PATENT-APPL-SN-481020 ..... N83-29681* #
US-PATENT-APPL-SN-491113 ..... N83-29707* #
US-PATENT-APPL-SN-492282 ..... N83-29391* #
US-PATENT-APPL-SN-493179 ..... N83-29806* #
US-PATENT-APPL-SN-495360 ..... N83-29706* #
US-PATENT-APPL-SN-500044 ..... N83-29595* #
US-PATENT-APPL-SN-501060 ..... N83-29302* #
US-PATENT-APPL-SN-502624 ..... N83-30269* #
US-PATENT-APPL-SN-506477 ..... N83-29590* #
US-PATENT-APPL-SN-507623 ..... N83-29591* #
US-PATENT-APPL-SN-507625 ..... N83-30268* #
US-PATENT-APPL-SN-507626 ..... N83-29804* #
US-PATENT-APPL-SN-508371 ..... N83-29173* #
US-PATENT-APPL-SN-508372 ..... N83-29783* #
US-PATENT-APPL-SN-508390 ..... N83-29654* #
US-PATENT-APPL-SN-510136 ..... N83-29446* #
US-PATENT-APPL-SN-511362 ..... N83-29594* #

US-PATENT-CASE-356-129 ..... N83-29680*
US-PATENT-CASE-368-6 ..... N83-29651*
US-PATENT-CASE-368-9 ..... N83-29651*
US-PATENT-CASE-368-10 ..... N83-29651*
US-PATENT-CASE-368-118 ..... N83-29651*
US-PATENT-CASE-368-119 ..... N83-29651*
US-PATENT-CASE-368-120 ..... N83-29651*

US-PATENT-CLASS-55-194 ..... N83-29652*
US-PATENT-CLASS-55-202 ..... N83-29652*
US-PATENT-CLASS-62-3 ..... N83-29625*
US-PATENT-CLASS-73-863.11 ..... N83-29650*
US-PATENT-CLASS-204-35N N83-29388*
US-PATENT-CLASS-204-37R N83-29388*
US-PATENT-CLASS-204-56R N83-29388*
US-PATENT-CLASS-244-115 ..... N83-29303*
US-PATENT-CLASS-244-161 ..... N83-29303*
US-PATENT-CLASS-269-152 ..... N83-29303*
US-PATENT-CLASS-269-242 ..... N83-29303*
US-PATENT-CLASS-269-244 ..... N83-29303*
US-PATENT-CLASS-294-86R N83-29303*
US-PATENT-CLASS-374-17 ..... N83-29650*
US-PATENT-CLASS-423-648R N83-29324*
US-PATENT-CLASS-423-649 ..... N83-29324*

US-PATENT-4,389,904 ..... N83-29650*
US-PATENT-4,391,423 ..... N83-29303*
US-PATENT-4,391,518 ..... N83-29680*
US-PATENT-4,392,356 ..... N83-29625*
US-PATENT-4,392,749 ..... N83-29651*
US-PATENT-4,392,874 ..... N83-29652*
US-PATENT-4,392,920 ..... N83-29388*
US-PATENT-4,393,039 ..... N83-29324*

USAAEFA-79-24 ..... N83-29201 #
USAAEFA-82-01 ..... N83-29199 #

USAAVRADCOM-TR-82-F-7 ..... N83-29171 #

USAF-AFM-88-3-CH-3 ..... N83-29452 #

USARIEM-M-8/83 ..... N83-29995 #

USARIEM-T5/82 ..... N83-30004 #

USGS-OFR-82-465 ..... N83-29909 #

USGS-WRD-PR-80-1 ..... N83-29802 #

USGS/WRD/HD-81/040 ..... N83-29802 #

USNA-EW-01-83 ..... N83-29238 #

UTD-E0533-01 ..... N83-29769* #

UTRC83-13 ..... N83-29629 #
UTRC83-15 ..... N83-29630 #

UVA-ER-756-82U ..... N83-29644 #

UWFPP-27 ..... N83-30239 #

UWME-DR-201-108-1 ..... N83-29316 #

VSC-TR-80-3 ..... N83-29896 #
VSC-TR-82-28 ..... N83-29895 #
VSC-TR-83-2 ..... N83-29903 #

WERKSTUK-25 ..... N83-29962 #
WERKSTUK-26 ..... N83-29961 #

WES/TR/GL-83-1-4 ..... N83-29906 #

WHOI-82-52 ..... N83-29965 #
WHOI-83-7 ..... N83-29956 #

WIS-12 ..... N83-29957 #

WRRC-BULL-109 ..... N83-29800 #

WTHD-150 ..... N83-30270 #
WTHD-153 ..... N83-29647 #

W83-01791 ..... N83-29800 #

ZW-8204 ..... N83-30144 #

U.S. GOVERNMENT PRINTING OFFICE: 1983—381-564/318

PUBLIC COLLECTIONS OF NASA DOCUMENTS

DOMESTIC

NASA distributes its technical documents and bibliographic tools to eleven special libraries located in the organizations listed below. Each library is prepared to furnish the public such services as reference assistance, interlibrary loans, photocopy service, and assistance in obtaining copies of NASA documents for retention.

CALIFORNIA
University of California, Berkeley
COLORADO
University of Colorado, Boulder
DISTRICT OF COLUMBIA
Library of Congress
GEORGIA
Georgia Institute of Technology, Atlanta
ILLINOIS
The John Crerar Library, Chicago
MASSACHUSETTS
Massachusetts Institute of Technology, Cambridge
MISSOURI
Linda Hall Library, Kansas City
NEW YORK
Columbia University, New York
OKLAHOMA
University of Oklahoma, Bizzell Library
PENNSYLVANIA
Carnegie Library of Pittsburgh
WASHINGTON
University of Washington, Seattle

NASA publications (those indicated by an '*' following the accession number) are also received by the following public and free libraries:

CALIFORNIA
Los Angeles Public Library
San Diego Public Library
COLORADO
Denver Public Library
CONNECTICUT
Hartford Public Library
MARYLAND
Enoch Pratt Free Library, Baltimore
MASSACHUSETTS
Boston Public Library
MICHIGAN
Detroit Public Library
MINNESOTA
Minneapolis Public Library and Information Center
NEW JERSEY
Trenton Public Library
NEW YORK
Brooklyn Public Library
Buffalo and Erie County Public Library
Rochester Public Library
New York Public Library
OHIO
Akron Public Library
Cincinnati and Hamilton County Public Library
Cleveland Public Library
Dayton Public Library
Toledo and Lucas County Public Library
TEXAS
Dallas Public Library
Fort Worth Public Library
WASHINGTON
Seattle Public Library
WISCONSIN
Milwaukee Public Library

An extensive collection of NASA and NASA-sponsored documents and aerospace publications available to the public for reference purposes is maintained by the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

EUROPEAN

An extensive collection of NASA and NASA-sponsored publications is maintained by the British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. By virtue of arrangements other than with NASA, the British Library Lending Division also has available many of the non-NASA publications cited in *STAR*. European requesters may purchase facsimile copy of microfiche of NASA and NASA-sponsored documents, those identified by both the symbols '#' and '*', from: ESA - Information Retrieval Service, European Space Agency, 8-10 rue Mario-Nikis, 75738 Paris CEDEX 15, France.

National Aeronautics and Space Administration

Washington, D.C.
20546

Official Business

Penalty for Private Use, $300

SPECIAL FOURTH CLASS MAIL
Book

Postage and Fees Paid
National Aeronautics and Space Administration
NASA-451

U.S. MAIL

10 1 STAR, 831005 S01733HU
UNIV OF MICHIGAN
HARLAN HATCHER LIBRARY
DOCUMENTS UNIT SERIALS DIV
ANN ARBOR MI 48109

ASTER: If Undeliverable (Section 158 Postal Manual) Do Not Return